

# ANNALS OF SURGERY

85877

A MONTHLY REVIEW OF SURGICAL SCIENCE AND PRACTICE

EDITED BY

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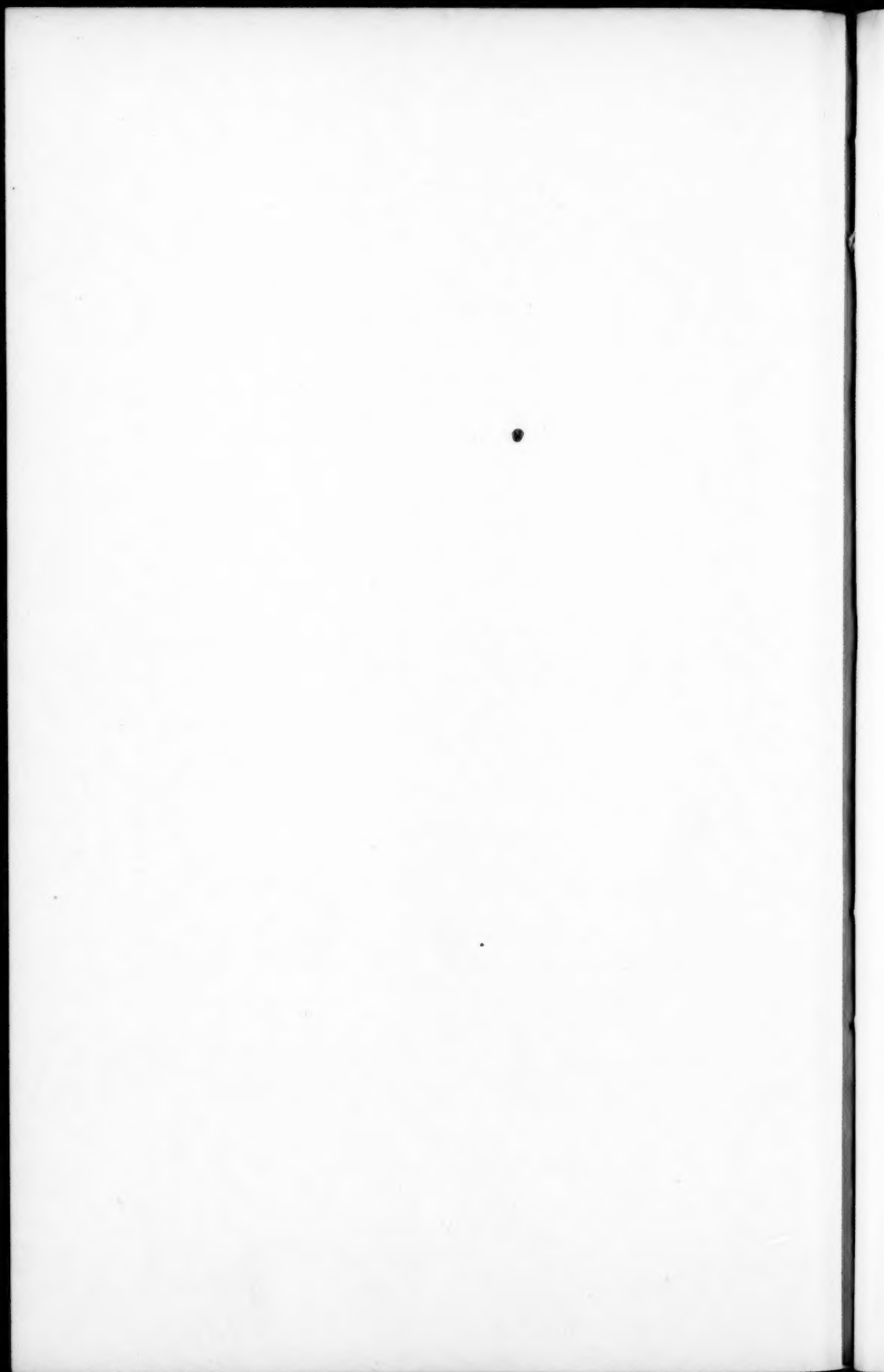
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VOLUME XV.

JANUARY—JUNE, 1892.

PHILADELPHIA:  
THE UNIVERSITY OF PENNSYLVANIA PRESS.  
1892.





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## THE TREATMENT OF TUBERCULOSIS OF BONES AND JOINTS BY PARENCHYMATOUS AND INTRA-ARTICULAR INJECTIONS.

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THE successful treatment in some cases of bone and joint tuberculosis by parenchymatous and intra-articular injections is one of the important achievements of modern surgery. Attempts in this direction were made long before the bacillus of tuberculosis was discovered, and before the true pathology of tubercular inflammation was understood. It is, however, since the true nature of the tubercular process has been revealed, and since the anti-bacterial action of a number of antiseptic substances has been carefully studied experimentally and clinically, that this method of treatment has been placed upon a scientific basis and has yielded satisfactory results. It is reasonable to assume that if by a harmless procedure safe and efficient chemical substances can be brought in contact with the affected tissues within diseased bones and joints that exercise a direct curative effect, it would constitute a decided improvement over former methods of treatment by internal administration or external application of the same remedies. The remedies which have been used for this purpose possess potent antiseptic and stimulating properties, and have been employed with a view to destroy the microbic cause of the disease, and to aid and expedite the process of repair.

The first attempts at intra-articular medication were made with a Pravaz syringe, the solution being thrown into the joint without previous evacuation of its fluid contents. At the present time the joint is punctured with a larger instrument, and if it contains fluid this is evacuated before the injection is made. If the joint contains tubercular pus, the intra-articular injection is preceded by irrigation of the joint with a mild antiseptic solution. The best instrument for puncturing a joint is a small trocar, through the canula of which the joint can be emptied, irrigated and injected. The puncture is to be made under strictest antiseptic precautions, and in accordance with the rules laid down elsewhere. In tubercular empyæma of a joint, irrigation should never be neglected as a preliminary step to the intra-articular injection. The simplest method of irrigating a joint is to connect the canula with a rubber tube attached to an irrigator holding the antiseptic solution. A 2% solution of boracic acid or a one-third of 1% solution of salicylic acid in sterilized water should be used for this purpose. The connection between canula and rubber tube should only be made after the surgeon has been satisfied that neither of them contain atmospheric air. By elevating the irrigator the fluid enters the joint, and the infusion should be continued until the capsule is thoroughly distended, when the rubber tube is detached and the fluid evacuated through the canula by compressing the joint. This procedure is repeated until the fluid returns perfectly clear. The intra-articular injection is made with an ordinary one ounce glass syringe, to the nozzle of which a piece of aseptic rubber tubing is attached, which is fastened to the end of the canula with the same care as in making the irrigation. The quantity of fluid which is to be injected should never be large enough to cause painful distension. After the canula is withdrawn the puncture should be sealed with a pledget of aseptic cotton and collodium.

Among the many substances which have been used for parenchymatous and intra-articular medication, I will only make mention of such that have received the most attention, and which experience has shown to be of some value.

*Tincture of iodine.*—This preparation of iodine, pure or di-

luted, with a solution of potassic iodide, was one of the first substances employed for intra-articular medication. The late Prof. Brainard, of Chicago, made extensive use of it in the treatment of chronic hydrops of joints. Usually the injection was made through the canula of a trocar after the joint had been emptied of its contents. The violent local and general reaction which sometimes followed the injection was in the way of a more general adoption of this method of treating diseased joints. It has yielded satisfactory results in the treatment of catarrhal synovitis as the vaso motor irritation which the iodine produces upon the inner surface of the cavity of the joint and the vascular changes connected with it bring about speedy retrograde metamorphosis of the inflammatory product, and hasten the process of absorption. It is never safe, even in such cases, to allow the tincture to remain in the joint, as the desired therapeutic effect can be obtained by injecting through the canula of the trocar from two to four drachms of the tincture, and after bringing it in contact with the entire surface of the joint by flexion and extension, friction and compression of the joint allow it to escape.

In the treatment of tubercular joints this remedy has not only proved a failure, but has often been followed by aggravation of the local conditions, and should be stricken from the list of therapeutic resources in the treatment of these affections.

*Carbolic Acid.*—Soon after carbolic acid was introduced into surgical practice as an antiseptic agent, it was also employed in the treatment of chronic inflammation of joints as an intra-articular injection. Hueter<sup>1</sup> resorted to parenchymatous and intra-articular injections of a 2 to 3% solution of carbolic acid in the treatment of chronic inflammation of bones and joints, upon the supposition that the carbolic acid when brought in direct contact with the diseased tissues would destroy the microbic cause of the inflammation. The injections were made with a Pravaz syringe every other day. In a case of osteomy-

<sup>1</sup>Die Wirkungen der parenchymatösen Carbolin injectionen bei Entzündungen der Gelenke und Knochen. Deutsche Zeitschrift f. Chirurgie, Bd. IV., p. 526, B. V., p. 120

elitis granulosa hyperplastica, the favorable effect of the injections became apparent soon after the treatment was commenced. Twenty injections in the course of five weeks resulted in a permanent cure.

Hueter's treatment was quite generally adopted in Germany but the results, on the whole, were so unsatisfactory that it was soon abandoned. The results have not been more encouraging by puncture and irrigation of the joint with solutions of carbolic acid, and at the present time carbolic acid has been given up almost completely as an anti-tubercular remedy. The same fate has met the following two substances:

*Arsenious Acid*.—Cavagnis,<sup>2</sup> of Venice, made a number of experiments on rabbits and guinea pigs to determine the therapeutic value of arsenic in the treatment of tuberculosis.

On April 17, 1881, four rabbits, two gray and two black weighing respectively 1,580, 1,590, 1,660 and 1,680 grammes, and four guinea pigs, weighing 370, 500, 510 and 610 grammes, were inoculated with tubercular material by subcutaneous injection. From the date of inoculation until May 28, the gray rabbits received one drop of Fowler's solution, diluted with distilled water, daily; the medicine was injected into the back part of the mouth with a Pravaz syringe; the black rabbits were given two drops daily in the same manner, while the guinea pigs received only half a drop. The smallest guinea pig was killed May 21, all the other animals June 6. One of the rabbits and all guinea pigs were tubercular, a tubercular ulcer at the point of inoculation had developed, the tissues of which contained numerous bacilli; cheesy foci in the vicinity of the ulcer, lumbar and prehepatic glands enlarged and partly cheesy, spleen enlarged, containing numerous tubercles; liver also the seat of tuberculosis. One of the guinea pigs had nine small tubercles in the lungs.

The other three rabbits presented an encapsulated abscess at site of inoculation, and one or two small cheesy masses in the vicinity, but aside of this, no evidences of tuberculosis could be detected. Inoculations made with the contents of the abscesses yielded negative results.

<sup>2</sup>Études de la Tuberculose, p. 462.

Landerer used this substance dissolved in distilled water in the proportion of 1:1000, and of this he injected from one to two syringefuls at intervals of a few days into the affected joint. The results must have been decidedly unfavorable, as it does not appear that this remedy was used for the same purpose by others.

*Corrosive Sublimate.*—Next to carbolic acid corrosive sublimate has been used more extensively as an antiseptic in the treatment of wounds than any other substance, but has never been popular as an anti-tubercular remedy. Experiments made by Cavagnis<sup>3</sup> to test its anti bacillary action yielded very favorable results as far as its action is concerned in preventing the growth of tubercle bacilli in the tissues of the rabbits.

On April 17, 1887, he inoculated three rabbits and three guinea pigs with tubercular material, and subjected these animals at once to a thorough treatment with corrosive sublimate, which was administered in doses of four drops of a solution of one part in hundred of distilled water, while the guinea pigs receive only one-fourth of this quantity. May 1, one rabbit died; another May 10; the animals were very much emaciated, and the necropsy revealed a small mass of cheesy appearance at the point of injection; no bacilli could be found in the caseous material, and the internal organs showed no trace of tuberculosis. The third rabbit became so emaciated that treatment was suspended May 10, and ten days later the animal died. A large abscess containing non-tubercular pus was found where the injection was made. Internal organs and lymphatic glands healthy. The guinea pigs were killed June 7. These animals presented a tubercular ulcer at the site of injection, extensive tuberculosis of the lymphatic glands, spleen and liver.

Vogt injected from three to five syringefuls into tubercular joints of the following solution: Corrosive sublimate 0.1, sodic chloride 1.0, distilled water, 50.0, but evidently without success, as Vogt himself soon suspended its use.

Another remedy that seems to have been used only by the one who suggested it and a few others is

<sup>3</sup>Op. cit.

*Phosphate of Lime.*—Kolischer<sup>4</sup> used an acidulated solution of phosphate of lime for parenchymatous and intra-articular injections in tuberculosis of bones and joints. The injections were made with an ordinary Pravaz syringe. Pain and other symptoms of local reaction always followed the injection and continued for five to six days, after which the limb was immobilized. After this the swelling diminished in size, and the tissues became firmer, showing that healing by cicatrization was progressing in a satisfactory manner.

E. Freund<sup>5</sup> gives full directions for the preparation of the solution and gauze of acid phosphate of lime.

In another publication Kolischer<sup>6</sup> reports 500 cases treated by his method, and admits that while tubercular joint affections were benefited by the treatment, it had no such influence in cases of central foci in bone and the sequestrating form of bone tuberculosis. This treatment was faithfully tried in the Klinik at Tübingen, but with negative results as we learn from the paper published by E. Müller.<sup>7</sup> It is not probable that the use of this remedy will be revived in the future in the treatment of tubercular affections of bones and joints.

*Chloride of Zinc.*—Lannelongue made an important contribution to the Academy of Medicine of Paris concerning the local treatment of tuberculosis by injections of solutions of chloride of zinc. His attention was called to this remedy during the treatment of a case of lymph-angioma. He noticed that one of its effects was its power of changing softened tissues into hard fibrous structures. During the last few months he treated 20 cases of surgical tuberculosis by parenchymatous injections of a solution of chloride of zinc. The injection is made into the periphery of the tubercular lesions, so as to stimulate the surrounding healthy tissue to active proliferation,

<sup>4</sup>Ein neue Heilverfahren bei lokalisirten Tuberculösen Processen. Wiener Med. Presse B. XXVIII, No. 22, 1887.

<sup>5</sup>Ueber die bei Kalkbehandlung der Local tuberculose zur Verwendung gelangender Lösungen. Wiener Med. Presse B. XXVIII, No. 24, 1887.

<sup>6</sup>Erahrungen über die Kalkbehandlung bei Local tuberkulose, Wiener Med. Presse, B. XXVII, No. 29.

<sup>7</sup>Ueber die Kalkbehandlung der localisirten tuberculösen Prozesse. Centralblatt f. Chirurgie, No. 15, 1888.



by which the focus is encapsulated. For tubercular disease of the knee four or five injections are usually made around the circumference of the superior cul-de-sac. From eight to ten drops of the solution (10%) suffice for the knee of a child, æt. 10. He claims excellent results in the treatment of tuberculosis of the lymphatic glands, and reports a few joint cases similarly benefited.

*Balsam of Peru.*—More than 30 years ago Sayre employed balsam of Peru in dressing wounds after resection of joints for tubercular affections. The results following his operations were much better than the average in the hands of other surgeons at that time, and we must attribute them, at least in part, to the use of this substance as a wound dressing.

Quite recently Landerer<sup>8</sup> has again called attention to the utility of the action of this antiseptic in arresting tubercular inflammation. As the result of his experiments on animals and from clinical experience with this remedy, he has come to the conclusion that its therapeutic action is owing to its stimulating effect on the tissues which brings the parts in such a condition as to render the pathogenic action of tubercle bacilli harmless. He ascertained by his experiments on rabbits that had been rendered tubercular by inoculation that the disease was favorably influenced by innocuous injections of an alkaline emulsion of this drug. In the treatment of fistulæ and deep-seated tubercular processes he uses a solution of the balsam in sulphuric ether 1-5 for injection.

For parenchymatous injections he employs an emulsion of the strength of 1:4 composed of oil of sweet almonds and a .07% solution of sodic chloride.

He reports 25 cases of tuberculosis of bone, generally implicating joints, greatly improved by injections of an emulsion of balsam of Peru combined in some cases with minor operative procedures, and in some of these cases the joint affections were so serious that amputation was proposed, but the operation was refused by the patients.

<sup>8</sup>Eine neue Behandlungsweise tuberculöser Processe. Münch. Med. Wochenschrift, No. 40, 1888.

Vámosy<sup>9</sup> has made extensive use of gauze prepared with balsam of Peru in the treatment of open wounds after the removal of tubercular products with signal success. He reports 28 cases treated according to Landerer's method and expresses himself as satisfied with the results. Among these cases he observed albuminuria three times, cystitis twice, and acute nephritis once, affections of the genito-urinary organs which he believes were cured by the balsam.

Binz<sup>10</sup> also calls attention to the irritating effect of this drug on the urinary apparatus.

Landerer thinks the danger in the use of the balsam has been greatly overestimated, and that it can be avoided by proper care in its use.

Although balsam of Peru does not appear to possess any direct anti-bacillary properties there can be no doubt that it can be applied with great benefit in the treatment of tuberculosis of bones and joints, especially after fistulous openings and open ulcerating surfaces have formed, as well as a dressing after resection of joints and the treatment of tubercular abscesses by incision and curetting.

*Camphorated Naphthol.*—Camphorated naphthol was first prepared by Désesquelle in 1888, and was first used in the surgical service of Pércer, at the Hôpital Lariboisière. It is a liquid prepared by taking b. naphthol 100 grammes, camphor 200 grammes, pulverizing each substance finely, gently heating the mixture until complete fusion; filter and preserve the liquid obtained in yellow glass bottles well corked. It possesses valuable antiseptic properties and is strongly recommended by Reboul<sup>11</sup> in the treatment of tuberculosis of bones and joints. He believes that in the local treatment of these affections the employment of potent antiseptic remedies is indicated, and such substances should be selected which, of equal therapeutic value, are non-toxic, so that they can be

<sup>9</sup>Zur Therapie der Localtuberculose mit Perubalsam. Wiener Med. Presse, B. xxx, No. 17-20, 1889.

<sup>10</sup>Ueber den Perubalsam. Centralblatt f. klin. Medicin., B. x, 1889.

<sup>11</sup>Contribution à l'étude du Traitement de la tuberculose des os, des articulations et des Synoviales tendineuses de l'emploi du Naphthol Camphré. Études expérimentales et cliniques sur la Tuberculose, Paris, 1888-1890, p. 608.



used freely and for a long time. According to his estimation camphorated naphthol fills these two conditions, being only slightly toxic, an efficient antiseptic, and destructive to the tubercle bacillus. As naphthol camphor dissolves iodine, the following mixture can be used.

Naphthol camphor,	-	-	-	-	90.0.
Iodine,	-	-	-	-	10.0.

The antiseptic properties of camphor naphthol have been demonstrated experimentally by Maximowitch, Park, Burrell and Edington, and corroborated by the clinical results of Nicaisé, Fernet, Schwartz, Peyrot, Reboul and others. The successful treatment of local tubercular foci by camphor naphthol has been established by the results obtained; but the action of this drug seems to be general as well, since the naphthol is absorbed and has been found in the urine, in a free state, of persons dressed with camphorated naphthol (Désesquelle).

If a wound after operations for tubercular affections is dressed with camphorated naphthol the urine shows the presence of naphthol for eight days, showing that its local and general action is prolonged, and may prevent relapses, secondary inoculations, complications following so frequently operations for local tuberculosis.

Périer and Reboul have employed camphorated naphthol extensively as an injection in doses varying from 50 to 100 grammes in the treatment of articular tuberculosis and tubercular abscesses with favorable results. The injections did not produce pain and were never followed by violent local reaction or symptoms of intoxication.

Parenchymatous injections made with an ordinary Pravaz syringe proved equally successful in the different forms of local tuberculosis. The injections were repeated every eight days.

Reboul reports a large number of cases of tuberculosis of bones and joints treated by incision, scraping and injections and dressings of naphthol camphor in which the results were all that could be desired, speedy healing of the wound and freedom of relapse. In a number of cases of spina ventosa, puncture and parenchymatous injections of camphor naphthol re-

peated weekly resulted in a permanent cure within three months. He believes that the curative effect of camphor naphthol like other anti-tubercular remedies, when applied locally, consists mainly in the production of an irritative ostitis, and supports this opinion by citing the case of a patient treated for a tubercular lesion of the great trochanter with camphorated naphthol, who died of pulmonary tuberculosis. Around the tubercular focus which had been treated the bone presented the characteristic appearances of plastic osteomyelitis, and no bacilli or miliary tubercles could be found. The action of the remedy substitutes for the tubercular a plastic osteomyelitis.

Reboul has great faith in the conscientious use of camphor naphthol as a local application and dressing in resection of tubercular joints in securing an aseptic healing of the wound and guarding against local relapses and general miliary tuberculosis. He cites a number of operations of this kind on the larger joints in which this remedy was relied upon exclusively as an antiseptic, and the results certainly appear to corroborate the claims made for it.

He has also been satisfied with the results of interstitial injections with camphor naphthol in the treatment of fungous disease of joints.

*Iodoform.*—Injections of iodoform in the treatment of tuberculosis of bones and joints and tubercular abscesses were advised by Billroth and Mikulicz<sup>12</sup> ten years ago, and the latter published another paper on this subject a year later,<sup>13</sup> but it was not until a few years later that it came into more general use through the teachings and writings of Mosetig v. Moorhof.<sup>14</sup>

Mazzoni<sup>15</sup> believes that iodol. ether glycerin injections into the tissues or joints has a favorable effect on tubercular lesions not only in arresting the disease, but also in expediting the subsequent reparative process.

<sup>12</sup>Berliner klin. Wochenschrift, 1881.

<sup>13</sup>Die Verwendung des Iodoforms in der Chirurgie. Archiv. f. klinische Chirurgie, B. xvii, p. 3, 1882).

<sup>14</sup>Zur Iodoformfrage. Wiener Medicinische Blätter, B. viii, No. 10-12, 1885.

<sup>15</sup>Ueber die Amvendung des Iodols in der chirurgischen Praxis. Berl. klin. Wochenschrift, No. 41. 1886.

At the present time the anti-tubercular action of iodoform is generally recognized from a clinical standpoint, but the results obtained by different experimenters on the lower animals concerning the same questions are at variance.

*Experimental Studies.*—Troje and Tangl,<sup>16</sup> to test the antibacillary action of iodoform, devised the following series of experiments: Iodoform vapor and powder were allowed to act on pure cultures, the powder was dusted on the culture medium in the neighborhood of cultures, and the vapor was allowed to accumulate in the culture chamber; animals were then inoculated with the growth and a series of "controls" was made. The vapor killed the bacilli only after fifty days, but then suppuration was produced by the action of chemical products as pointed out by Koch. After the vapor had acted six days, however, the rapidity of the growth of the bacillus was diminished, whilst it had quite ceased at the end of four weeks, and the bacilli at this stage were distinctly weakened. When strewn on the culture the drug so diminished the virulence of the bacillus that after sixteen days nothing but cold abscesses were formed after inoculation, many giant cells being present, and the course of the disease was very chronic. When mixed in the proportion of one part of the active culture to fifteen parts of iodoform, it was found that the bacilli were not always killed in fourteen days, although in one case they were quite innocuous at the end of eight days; at the end of three weeks they were dead, or at any rate harmless. The authors found also that they could obtain bacilli which would set up only chronic tubercle by means of the action of the iodoform outside the body, for when inoculating tubercle bacilli so treated they obtained a disease which was identical with *Perlsucht*, both in its clinical and pathological characters. Mixed with olive oil or glycerine in proportions of one part of iodoform to ten of the vehicle, they found that the organism was killed in sixteen days, the oil and the iodoform being much more efficacious than the glycerine mixture. Virulent bacilli can grow in the the tissues whatever iodoform mixture be intro-

<sup>16</sup>Berl. klin. Wochenschrift, No. 20, 1891. Supplement to British Med. Journal. July 18, 1891.

duced along with them, this being due to the fact that the tissues are such a good medium for the growth of the organism that the energy of the latter becomes very great, and the iodoform can exert little action on its growth, although outside the body where the conditions for growth are not so favorable the iodoform has a decided inhibitory effect. In the case of cold abscesses the growth of the bacillus is not so active, and therefore the iodoform has a better chance of exerting its valuable therapeutic properties. The authors found that the iodoform must act directly on the bacilli, as they have been able to demonstrate that it has a deleterious irritant action on the tissues; they also find that the action is most satisfactory in those cases where the number of bacilli is comparatively small, in which case the iodoform appears to prevent the growth of the bacilli. Their investigations have led them to the practical conclusion that iodoform is a true disinfecting agent as far as the tubercle bacillus is concerned; that it has a direct destructive effect upon the bacillus if left sufficiently long in contact. They have also shown that this drug diminishes the virulence of the tubercle bacillus and that cultures thus treated produce a more benign form of tuberculosis in animals.

Gosselin<sup>17</sup> made a series of experiments on animals with mercurial preparations and iodoform in order to ascertain if any of these substances could so alter the tissues as to render them unfit as a soil for the tubercle bacillus. He reasoned that if such a condition could be brought about by the introduction of chemical substances otherwise harmless an existing tubercular focus would be harmless, as local and general dissemination could no longer occur. Experiments with mercuric bichloride and biniodide had no effect in this direction. On the other hand these mercurial salts appeared to aggravate the tubercular process. Iodoform yielded better results. It was administered like the salts of mercury subcutaneously. It was his intention to render the animals refractory to the tubercle bacillus by saturating the tissues with iodoform prior

<sup>17</sup>Sur l'Attenuation du virus de la tuberculose, Études sur la tuberculose, er Juillet, 1887.

to the inoculation. He used a solution of iodoform of 10:100. Six rabbits were selected, three of which were subjected to iodoform treatment, while the remaining three were not thus treated, but kept under exactly similar conditions. Three drops of the ethereal solution of iodoform were injected under the skin every day for two months. In the beginning the iodoform was badly borne, as it diminished the appetite and caused frequent attacks of diarrhoea and the animals cowered in a corner of the cage and showed no inclination to move about. These symptoms always disappeared with the suspension of the injections. After a few days all the secretions and the tissues in different parts of the body responded to the iodine test.

The injections had to be made with great care as they were often followed by acute inflammation of the skin and subcutaneous cellular tissue. Four months later all of the animals were inoculated. The three control animals died of tuberculosis in from thirty to fifty days, the iodoformized animals showed a partial immunity and manifested no symptoms of tuberculosis until the expiration of fifty days, and death did not occur until from the seventieth to the ninetieth day after inoculation.

The same experiments were repeated three times with identical results. In two instances the iodoformized animals were killed respectively on the twenty-fifth and thirtieth day after operation.

Nothing further was found at the point of inoculation than a slight circumscribed peritonitis in one, and a limited area of adhesion between the peritoneal surfaces in the other. Examination of specimens stained by Ehrlich's method showed numerous bacilli in the adherent parts, and a fragment of lymph deposited on the surface implanted into the peritoneal cavity of a guinea-pig caused death from tuberculosis in twenty-seven days. Iodoformized guinea-pigs proved more refractory to the tubercle bacillus than rabbits; in one instance the animal lived one hundred and two days after inoculation.

In another very interesting series of experiments Gosselin reversed the experiments, rendering the animals first tubercular

by inoculation and then resorting to treatment with iodoform. In these experiments rabbits and guinea pigs were used.

Soon after the animals were inoculated with tubercular matter, daily subcutaneous injections of two to three drops of iodoform ether (1:10) were made, suspending the treatment as soon as iodoform intoxication set in and beginning anew when they disappeared, grading the absorption of iodoform so as to obtain the maximum impregnation of the organism with this drug compatible with life in the shortest possible space of time.

The experiments showed that susceptibility to iodoform differs not only in the same species of animals, but also in different members of the same family. If the animal is not closely watched, it will die quickly, poisoned by the combined action of ether and iodoform.

Three rabbits and two guinea-pigs remained well ninety-five days after inoculation and were killed and the most careful search showed no trace of tuberculosis at the point of inoculation and all of the organs presented a perfectly healthy appearance.

Two rabbits and one guinea-pig were in good health one hundred and sixty days after inoculation. The two rabbits were considerably emaciated and their appetite somewhat diminished. These symptoms were due to the iodoform, for as soon as the use of this remedy was suspended the animals were restored to perfect health. The dose of iodoform was diminished every five days for a fortnight. A third rabbit died from iodoform poisoning on the thirteenth day and a careful autopsy did not reveal a trace of tuberculosis. At the seat of injection there was a circumscribed inflammatory exudation apparently free from bacilli. Two guinea-pigs were inoculated with fragments of tissue from this place and these animals, with the exception of slight emaciation, remained in good health one hundred and sixty-one days later.

These studies appear to prove that the prolonged use of iodoform by subcutaneous injection carried to the point of toxic symptoms prevents, or at least retards, the extension of the tubercular process.

Thiéry<sup>18</sup> does not believe that iodoform possesses such di-



rect antitubercular properties as expressed by Gosselin, but he is willing to admit that it has a potent influence in retarding the tubercular process. In opposition to the conclusions drawn by Gosselin he reminds his readers that it is well known that tuberculosis, under favorable circumstances, is occasionally spontaneously cured or curable. In 131 autopsies made at the Morgue Vibert he noticed evidences of a former tubercular process, which had become arrested spontaneously, and the patients succumbed to other diseases. In seventeen, out of the twenty-five cases, the former tubercular depôt was indicated by a cicatrix or chalky deposit. As further proof that tuberculosis does not always manifest progressive tendencies and undergoes a cure unaided by medication may be mentioned the writings of Leroux, Cruveilheir,<sup>19</sup> Rogée, who in his work<sup>20</sup> makes the statement that in fifty out of one hundred autopsies, which he made on old men, he found evidences of pulmonary phthisis, which had been completely cured. Boudet;<sup>21</sup> Gaucher studied carefully the process of spontaneous cure of tubercle by cicatrization. Similar and other observations in the same direction were made by Grisolle, Guencon de Mussy, Lebert, Jaccoud, Herard, Cornil, Peter and lastly the work of Thavi.<sup>22</sup>

Jeannel<sup>24</sup> has made experimental investigation in the same direction concerning the curability of tuberculosis as Gosselin.

He made the following four series of experiments:

1. Local treatment alone.
2. Local and general treatment combined.
3. General treatment alone from the beginning of the disease.
4. General treatment alone from a period remote from the

<sup>18</sup>De la Tuberculose Chirurgicale, etc., Paris, 1890, p. 485.

<sup>19</sup>Anat. Path. Gén., T. 10, p. 616.

<sup>20</sup>Arch. Path. Gén. de Med., 1829, T. v.

<sup>21</sup>Thèse de Paris, 1843.

<sup>22</sup>Archives de Physiologie, 1878.

<sup>23</sup>Clinique Chir. des Mal. Chron., 1877.

<sup>24</sup>Recherches sur la Généralisation de la Tuberculose Expérimentale, Congrès de la Tuberculose, Paris, p. 351. Nouvelles recherches expérimentales sur la tuberculose et sa curabilité, Études sur la tuberculose, fasc., ii, p. 416.

beginning of the disease, that is, from the time inoculation was made.

On the whole, the results were not very encouraging. The local treatment alone or combined with general treatment did not prevent the development of tuberculosis, all of the inoculated rabbits died from well-marked tubercular affections and the treatment did not even retard the progress of the disease or postpone the fatal termination. General treatment alone inaugurated at the time the inoculation was made proved also inefficacious and Jeannel even intimates that the treatment by iodoform ether has neither the power to cure or to retard tuberculosis in the rabbit. Finally, general treatment alone instituted at a period remote from the beginning of the disease was a complete failure in every respect. Remarking how these results were so widely at variance with those claimed by Gosse-lin, the latter replied that he positively maintained the assertion previously made concerning the curability of local tuberculosis by treatment with iodoform injections. He at the same time insisted that generalization of tuberculosis varies with the place where the inoculation is made.

The discrepancy of the view entertained by these French investigators leaves the experimental field concerning the curability of tuberculosis by the local and subcutaneous use of iodoform open for future research to determine definitely the value of this remedy in the treatment of this disease.

*Clinical Results.*—The clinical results have been more uniformly in support of the anti-tubercular action of iodoform than the conclusions drawn from experimental work. The iodoform treatment of tubercular affections of bones and joints found an enthusiastic advocate in France in the person of Verneuil;<sup>25</sup> through his example and influence it found ready adoption at once in different parts of that country by the most prominent surgeons.

Vercherè<sup>26</sup> expresses himself as highly pleased with the results obtained by injections of ethereal solutions of iodoform,

<sup>25</sup>Injections d'ether-iodoforme dans les abcès froids. *Revue de Chirurgie*, 1885, p. 428, et sequi.

<sup>26</sup>*Revue de Chirurgie*, 1886, p. 476-502.



as advised by Vereuil a year after the latter surgeon published his first paper on the subject.

Second<sup>27</sup> restricts the use of the iodoform treatment to patients greatly debilitated by the disease, and in cases in which the primary disease is inaccessible to radical measures.

Barrette<sup>28</sup> reports twenty-eight observations, of his own with very favorable results. Among these was a man, *æt.* 33, with tubercular osteo-myelitis of the fourth rib, complicated by incipient pulmonary phthisis. The cold abscess which had developed in connection with the rib was treated by iodoform injections and the local lesion was cured.

Two cases of cold abscess originating from the spine were also cured. In one case in which an abscess started from a tubercular focus after resection of the elbow the injections were followed by death from iodoform intoxication. The necropsy revealed an incurable chronic affection of the kidneys. Reclus<sup>29</sup> in giving his results of this method of treating tubercular affections reports only two complete failures, five improved, meanwhile two died of slow tubercular lung complications. Eight recovered in spite of large collections located where operation was practically impossible and in nine cases the final outcome could not be learned. He injects into large abscesses from 60 to 120 grammes of a 5% solution of iodoform in ether. The injections to be repeated in from three to four weeks, and in some cases the injection has to be repeated a third and a fourth time; after the injections the abscess wall becomes greatly disturbed by the ether gas; if the vitality of the overlying skin is considerably impaired necrosis may take place from the pressure. In such cases the ether vapor is to be removed by inserting a small trocar. In a few cases this treatment was followed by suppuration and the formation of a fistula, which, however, soon healed. He is of the opinion that in all of the cases in which a cure followed the same re-

<sup>27</sup>Abscès Tuberculeux de la Cuisse, injections d'ether iodoformé ou opération sanglante. *Gazette des hôpitaux*, No. 146, 1887.

<sup>28</sup>Sur le traitement des manifestations externes de la tuberculose. *Congrès de la Tuberculose*, p. 586.

<sup>29</sup>*Gazette Hebdomadaire*, 1887.

sult could have been obtained by incision and curetting, but the latter treatment would have required more time and would have left unsightly scars. In favor of the iodoform treatment he also maintains that it is less likely to be followed by a relapse, and cites Trélat, Guyon, Bouilly, Nélaton, Richelot, Quenu, Peyrot and Bruns as entertaining the same opinion.

Tilanus<sup>30</sup> studied the antiseptic and antibacillary properties of iodoform, and concludes that it is a useful remedy in the treatment of tuberculosis.

Villemin<sup>31</sup> is of the opinion that iodoform is deserving of the confidence of the surgeons. The French surgeons have employed almost exclusively the ethereal solutions of iodoform (5.100) and we hear of cases in which, like in some of the experiments on animals, the injections caused a violent local inflammation and even gangrene. The injection is also painful, as the temperature of the body is sufficiently high to vaporize the ether in a very short time after its injection, which causes painful and sometimes dangerous tension in the joint or abscess. It appears also that iodoform intoxication occurs more frequently when the ethereal solution is used than when the iodoform is injected in the form of an emulsion in glycerine, or in olive oil. A case of death from iodoform intoxication was alluded to above and another occurred in the practice of Barvis.<sup>32</sup>

The patient was a soldier, æt. 24, the subject of a large cold abscess in the region of the left wall of the chest. This was punctured and after evacuation of its contents from 50 to 60 grammes of a 5% ethereal solution of iodoform were injected. Immediately after the injection the patient went into collapse, and it is possible that some of the solution was injected into the pleural cavity. In explanation of the sudden death it may be suspected that a small quantity of the ether vapor was forced into the venous circulation and that the collapse was

<sup>30</sup>Propriétés de l'iodoforme. *Revue de Chirurgie* février, 1890.

<sup>31</sup>Étude expérimentale de l'action de quelques agents chimiques sur le développement du bacille de la tuberculose, 1888.

<sup>32</sup>Du traitement des Abscès froids, Intoxication iodoformique mortelle. *Arch. de Méd. et de Pharmacie*, T. xvi, No. 8, 1890.

### TUBERCULOSIS OF BONES AND JOINTS.

caused by ether vapor embolism, but Barvis attributes the death in this case to acute iodoform intoxication. In view of the fact that ether iodoform injections are always productive of pain, and not infrequently produce intense local reaction, and that the ether used may become a source of danger and that they are more liable to give rise to intoxication than when iodoform glycerine emulsion is used, the latter preparation should be used exclusively. In Germany the latter method of administration is used almost exclusively.

Bruns uses a 10% mixture of iodoform in glycerine or olive oil, always taking the precaution to sterilize the mixture. Krause recommends the following mixture:

R	Iodoform subtt. pulveris,	-	-	-	50.0.
	Mucil. gummi Arab,	-	-	-	2.30.
	Glycerini,	-	-	-	83.0.
	Aq. distillat., q.s. ad.,	-	-	-	500.0.

S.: Ten per cent. iodoform mixture. To this mixture he adds one per cent of pure carbolic acid.

Whatever formula for the solution is selected, not more than half a drachm of the iodoform should be injected at the first time, and in children even less. If this dose does not produce any unpleasant symptoms, it may be increased the next time the operation is repeated. If used in this manner the risk of iodoform intoxication appears to be *nil* or at least very remote as not a single instance was observed in 108 cases treated in the Tübingen clinic by Bruns. The best results with iodoform injections come from the Halle and Tübingen clinics. This is undoubtedly owing to the fact that in these institutions this treatment has been very extensively used, and the large experience thus gained has enabled the surgeons to make a proper selection of cases, and apply the treatment in the most efficient manner.

Bruns<sup>33</sup> injects every two weeks a mixture composed of 10 parts of iodoform, 50 of glycerine and 50 of distilled water.

<sup>33</sup>Ueber die anti-tuberculöse Wirkung des Iodoforms, Verh. der. Deutschen Gesellschaft, f. Chirurgie, 1877.

In his first report he states that of 54 cases of tubercular abscess, 40 have recovered under this treatment.

In a later publication the same author<sup>34</sup> asserts that the anti-tubercular action of iodoform has been demonstrated. In order, however, for this drug to exert its specific action it is necessary that the whole interior surface of a joint or tubercular abscess should be acted upon and the action should be uninterrupted and continued for a long time. The curative effect often only becomes apparent after three or four months, but from this time the abscess gradually disappears. Of 100 cases of tubercular abscess treated in his clinic during the last five years 80% were cured, and during four years 50 cases of joint tuberculosis were also cured. He uses now a 10 to 20% mixture of iodoform in pure glycerine or olive oil prepared fresh and thoroughly sterilized before each injection.

In the case of fungous joints he makes the injection not only into the cavity of the joint, but also into the thickened capsule, making the puncture at different points and injecting from 2 to 6 cm. of the mixture. In tubercular hydrops and tubercular abscess the fluid or softened contents are first removed, whereupon 10 to 30 cm. of the mixture are injected.

Neither pain nor symptoms of local irritation follow the procedure, but the temperature usually shows a rise from one to two degrees, which, however, disappears after a few days. He does not immobilize the injected joints. He has never met with cases of iodoform intoxication from the injections. Parenchymatous injections are to be repeated every eight days, intra-articular injections every two to four weeks. Symptoms of improvement seldom appear before the expiration of six to eight weeks, although the pain diminished at an earlier date.

Shrinking of the fungous capsule is the surest indication of beginning improvement. In children suffering from tuberculosis of joints the functional result is frequently perfect if the treatment is begun before the disease has resulted in extensive destruction of the soft structures of the joint. In adults the

<sup>34</sup>Ueber die Behandlung tuberculöser Abscesse und Gelenkerkrankungen mit Iodoform injectionen. Beiträge zur klinischen Chirurgie, vi, 3, p. 639, 1890.

best results often consist in a useful but partially or completely anchylosed limb.

Wendelstadt<sup>35</sup> uses a mixture of iodoform in olive oil in the proportion of 5:25. He insists that the mixture should be prepared fresh every time, as in mixtures kept for some time free iodine is generated, the presence of which can be recognized by the mixture presenting a brownish red color.

As a parenchymatous injection he throws from 2 to 3 cm. of this mixture into the tissues with an ordinary Pravaz syringe. The injection is repeated every eight days; the puncture should always be made at a different point in order to reach successively different parts of the focus.

In several cases he observed a rise in the temperature to 40° C. the same day, but the febrile reaction always subsided in a short time. This method was applied in 109 cases of local tuberculosis; of this number 28 were later treated by incisions and évitement. A permanent cure was obtained in 36, improved 37, and not much benefited 12, and 24 remained under treatment.

Andrassy<sup>36</sup> gives the particulars of the 22 cases of cold abscesses treated by iodoform injection that were first reported from the Tübingen clinic by Bruns. Of this number 20 were perfectly and permanently cured. In one case the abscess had to be opened. The largest dose of iodoform used was 10 grms. No symptoms of intoxication were observed in any of these cases, but occasionally a considerable rise in temperature followed the procedure. In most cases the operation had to be repeated two or three times at intervals of two weeks. The healing process was generally completed in from one-half to two and one-half months.

Billroth<sup>37</sup> uses a 10% iodoform glycerine emulsion. The tubercular joint or abscess is evacuated and from 40 to 50

<sup>35</sup>Zur Behandlung der tuberculösen Knochen und Gelenkerkrankungen durch parenchymatöse Injectionen von Iodoformol. *Centralblatt f. Chirurgie*, No. 38, 1889.

<sup>36</sup>Beiträge zur Behandlung der kalten Abscesse, insbesondere mittelst Iodoform-injectionen. *Bruns' Beiträge zur klinischen Chirurgie*, ii, 1887.

<sup>37</sup>Ueber die Behandlung kalter Abscesse in tuberculöser Caries mit Iodoform Emulsion.

grammes of the mixture are injected. The injection is not repeated until the urine no longer reacts to the iodine test.

During two years Krause<sup>38</sup> treated tubercular affections of the following joints by intra-articular injections of iodoform:

Knee-joint,	-	-	-	-	-	-	36.
Hip-joint,	-	-	-	-	-	-	13.
Tarsal-joint,	-	-	-	-	-	-	6.
Wrist-joint,	-	-	-	-	-	-	5.
Elbow-joint,	-	-	-	-	-	-	1.

The treatment was not completed in all of these cases, but a cure had been effected in the following:

Knee-joint,	-	-	-	-	-	-	15.
Hip-joint,	-	-	-	-	-	-	4.
Tarsal-joint,	-	-	-	-	-	-	1.
Wrist-joint,	-	-	-	-	-	-	3.

Three of the cases that were cured were sent to the clinic to undergo an amputation.

Although in the cases where the wrist-joint was involved the treatment failed in restoring motion, it made the fingers more movable and useful. In the hip-joint cases recovery usually resulted in almost total ankylosis.

This was evidently due to the fact that the severest cases were subjected to this treatment, and much better functional results can be expected if this treatment is commenced during the early stages of the disease.

Improvement was noted in nearly all cases that remained under treatment. The best results were realized from the treatment in tuberculosis of the knee and wrist-joints. He recommends that if the canula of a large trocar is not large enough through which the joint can be completely emptied of its contents that an incision should be made for this purpose, and the wound sutured before the injection is made.

Of the cold abscesses which were subjected to treatment by

<sup>38</sup>Ueber den heutigen Standpunkt in der Behandlung der tuberculösen Knochen und Gelenk Krankheiten. Berl. klin. Wochenschrift, No. 49, 1890.



iodoform injection 50% were cured. He believes that intoxication symptoms are not produced by using emulsion of iodoform because none of the iodoform is in solution and on this account absorption is very slow. He has injected the emulsion which he uses in doses varying from 5 to 80 grammes. The injections never caused much pain but were often followed by a rise of temperature for a short time. The first symptoms which denote that improvement is taking place are lessening of pain and diminution of swelling. Peri-articular abscesses recurred several times after they were apparently cured and required repetition of treatment.

Trendelenburg has treated 135 cases of all grades of severity by the injection method, making one injection of five grammes every eight days. The most striking results were obtained in wrist-joint tuberculosis in adults—a disease which usually gives a bad prognosis and frequently necessitates amputation. In 68% of all cases the treatment had a favorable effect.

*Immediate and Remote Dangers Attending Iodoform Injections.* The dangers attending the treatment of tubercular affections of bones and joints by iodoform injections may arise from iodoform intoxication, the action of the menstruum employed, secondary infection, and injury of important parts by the instrument used in making the puncture.

In a case of Boeckel's,<sup>39</sup> the patient died during the operation. It was found that the abscess communicated with the subclavian artery. In three of König's<sup>40</sup> cases the puncture of the abscess was followed by profuse hæmorrhage, due to arterial erosion. The arteries involved were the gluteal, the deep femoral, and the external plantar. These had to be ligated. A similar complication occurred in two cases under the care of Lindner,<sup>41</sup> one of fatal hæmorrhage from the femoral, and the other from the iliac vein.

Dollinger<sup>42</sup> does not approve of the iodoform ether injection.

<sup>39</sup>London Medical Record, 1889.

<sup>40</sup>Centralblatt f. die gesammte Therapie, 1887.

<sup>41</sup>Deut. Med. Woch., 1887.

<sup>42</sup>Beiträge zur Iodoform-ether behandlung der tuberculosen Knochen entzündung. Centralblatt f. Chirurgie, May 18, 1889.

tions as advised by Verneuil, as he has found in his experience that in children they did not induce recovery in a single case. He not only regards them useless, but harmful, as the injection of even small doses produced deafness, headache, and nausea, while larger quantities were followed by loss of consciousness, impaired respiration and acute cystitis. At the moment of injection some headache may be felt, and there may be an evening rise of temperature of 3 to 4 degrees. The rapid evaporation of the ether may cause necrosis of the abscess wall, and if, for example, psoas abscess from rapid over-distension should rupture into the peritoneal cavity, death might result from such injections from septic peritonitis.

Heusner<sup>43</sup> reports a case of iodoform intoxication caused by an intra-articular injection of 0.1 of iodoform in glycerine. Bramann observed quite grave symptoms of intoxication after an injection containing 2.0 of iodoform. The patient was a boy. Later, the injection of the same amount produced no untoward symptoms.

Trendelenburg first used iodoform ether, but in a short time the injection produced gangrene of the overlying abscess wall in three cases, and after that he has used the emulsion exclusively and has not observed such a result since. Gangrene of the overlying tissues and iodoform intoxication have only been observed after iodoform ether injections; the first is caused by the overdistension resulting from vaporization of the ether and the latter is due to rapid absorption of the iodoform kept in solution by the ether. Another possible remote source of danger attending the injection of the ethereal solution is the entrance of ether vapor into one of the veins causing death from ether-embolism.

The dangers just enumerated do not belong to injections of iodoform held in suspension in glycerine or olive oil. Accidental infection, which has occasionally occurred during or after the injection, is, of course, caused by a faulty antiseptis, and has happened from the use of iodoform by parenchymatous and intra-articular injections irrespective of the menstruum used. If such an accident takes place, it will become neces-

<sup>43</sup>Berl. klin. Woch., Oct. 5, 1891.



sary to make a puncture with a large trocar and evacuate the pus through the canula and resort at once to irrigation, with a 3% solution of boracic acid, or treatment by incision and drainage may be required. Dangerous hæmorrhage is occasionally encountered in treating tubercular abscesses by incision and scraping when a vessel of considerable size has become eroded and the possible occurrence of this accident does not militate against the treatment by iodoform injections.

*Action of Iodoform on Tubercular Tissue.*—If iodoform in the form of an emulsion is injected into an empty tubercular joint or abscess, and an effort made to diffuse it over the whole interior surface, by passive motion, pressure and rubbing, the fine particles of iodoform will soon be equally distributed over the entire surface clinging to the granulations, fibrinous masses, or the cheesy material lining the cavity. The iodoform produces no violent irritation, its action on the tissues is mildly stimulating. The re-accumulation of fluid in the joint or tubercular pus in the abscess is slow and if the procedure is repeated after eight days to two weeks the fluid withdrawn will contain particles of iodoform, showing that the absorption of this substance, when not applied in solution, is very slow. At the same time the fluid will have changed its character somewhat, containing elements the presence of which indicates that remnants of dead tissue products of coagulation necrosis are being thrown off and that a reparative process has been initiated. The first effect of the iodoform on the tissues lining the joint or cavity is to bring about rapid disintegration of the tubercular product, which then is displaced by a layer of active and very vascular granulations.

Bruns and Nauwerk<sup>44</sup> incised tubercular abscesses treated by iodoform injections at different intervals after the injection and extirpated pieces of the abscess wall for microscopical examination. A few weeks after injection they found that the tubercle bacilli had disappeared, the miliary tubercles softened by infiltration with round cells and œdematous inhibition of a serous fluid; further on the tubercles disappeared by fatty de-

<sup>44</sup>Ueber die antituberculose Wirkung des Iodoforms, Klinische und Histologische Untersuchungen. Beiträge zur Klinischen Chirurgie, iii. Tübingen, 1887.

generation of the cells and liquefaction of the cellular detritus. Hand in hand with the degeneration and liquefaction of the tubercular product could be witnessed in the adjacent tissues a process of repair in the shape of a wall of granulation tissue which formed a line of demarcation between the healthy and diseased tissue which consumed in part the dead sterile tubercular tissue and detached the balance. As soon as the dead tissue was disposed of by absorption the granulations began to cicatrize and were gradually converted into connective tissue, and with this change the process of the healing was completed. Krause made similar examinations and corroborates the observations made by Bruns and Nauwerk. That the curative effect of iodoform in the treatment of tubercular joints and abscesses is not owing to the mere puncture and evacuation, but is brought about by the specific action of iodoform on the tubercular products there can be no doubt as tapping for these conditions was employed long before iodoform was used in surgery, but this procedure seldom yielded more than temporary relief. Stockma treated five tubercular abscesses by tapping alone but always with negative results. If he injected the contents of tubercular abscesses, treated by different methods, into the anterior chamber of the eye in rabbits, the result was always positive, except in the case of abscesses treated by iodoform injections, in which a sufficient time had elapsed for the iodoform to exert its specific anti-bacillary effect. Iodoform exercises a double therapeutic action on tubercular tissue when used by parenchymatous or intra-articular injections, it destroys the bacillus of tuberculosis and aids the removal of the dead sterile tissue and favors the subsequent reparative process by its stimulating action on the surrounding healthy tissue, properties not possessed to the same degree by any other, as yet known, substance.

*Indications.*—The curative power of iodoform injections has so far been most manifest in the treatment of heretofore most hopeless cases of surgical tuberculosis, tubercular abscess in connection with an inaccessible osseous focus. One of the most brilliant achievements of modern surgery is the successful treatment of tubercular abscesses developing in the course of tubercular spondylitis by iodoform injections. Statistics

show that more than 50% of such cases are amenable to this method of treatment. In the successful cases not only the abscess but the primary bone lesion is also cured.

One of the most striking illustrations of the efficiency of iodoform treatment in these grave cases recently came under my observation. The patient was a delicate girl, *æt.* 8, who had suffered from a tubercular spondylitis at the junction of the last dorsal with the first lumbar vertebra for six months. Slight angular posterior curvature. Within two months an enormous abscess developed in the right lumbar and iliac regions. Below the abscess extended as far as Poupart's ligament, above to the last rib. The abscess was very prominent in the lumbar and inguinal regions. The child had a temperature of 104° F. every evening. The abscess was punctured under strict antiseptic precautions in the lumbar region, and nearly two quarts of tubercular pus evacuated. The abscess cavity was irrigated with a 3% boracic acid solution until the fluid returned perfectly clear and two ounces of a 10% mixture of iodoform in glycerine injected. The puncture was sealed with a pledget of antiseptic cotton and iodoform colloidum.

The first injection had no effect in reducing the temperature. At the end of a week it was repeated, and about half as much tubercular pus removed. The temperature in a few days after the second injection was normal. The third and last injection was made four weeks after the first. At this time only about 6 ounces of a viscid fluid were removed. The child improved in general health, and after this time no reaccumulation of fluid occurred. At the present time, six months after treatment was commenced, the child is wearing a plaster-of-Paris corset, and appears to be in perfect health.

No one who is familiar with the efficacy of iodoform injections in the treatment of tubercular abscesses would or should neglect to resort to it when called upon to treat tubercular abscess in communication with an inaccessible primary tubercular focus. This applies with special force to abscesses developing in connection with tuberculosis of the vertebræ and some of the pelvic bones.

This treatment is again applicable and has yielded excellent

results in tuberculosis of the knee and other readily accessible joints with or without the formation of para-articular abscesses.

The treatment is most useful if the joint is distended with fluid, as under such circumstances, after the removal of the fluid the iodoform can be brought in contact with the entire surface of the cavity. This is often impossible if portions of the joint have been shut out by intra-articular adhesions. Irrigation of the joint should never be omitted if it contains pus, flakes of lymph, or detached broken down fragments of tubercular tissue, and it is in such cases that the canula of even a large trocar is often not of sufficient size to evacuate the joint or abscess properly, and that the puncture has to be followed by an incision large enough to meet the requirements.

If the joint contains no fluid it is difficult and usually impossible to reach all of the infected tissues by an intra-articular injection, and it is in such cases that it must be combined with parenchymatous injections, and the site of puncture changed at each operation. As no fluid is to be removed, and no irrigation to be made under such circumstances, the necessary amount of iodoform emulsion is thrown into the joint and into the thickened fungous capsule with an ordinary Pravaz syringe, supplied with a large needle. The puncture is made at different points every time the procedure is repeated. It cannot be expected that a cure can be effected by this method of treatment if the primary focus contains large masses of cheesy material, or a sequestrum of considerable size. But even in such cases, if the injections are made with the requisite degree of care, the treatment is harmless and results in great benefit in preparing the parts for subsequent surgical treatment by operation.

*Points to Be Remembered in Making Intra-Articular and Parenchymatous Injections.*—The strictest antiseptic precautions must be practiced in making the injections, as neglect in this direction would not only interfere with an ideal result of the treatment, but would expose the part and the patient to the risks and dangers incident to a suppurative inflammation with all its immediate and remote consequences. The surface where the puncture is to be made should be shaved and thoroughly scrubbed with hot water and potash soap, and careful-

ly disinfected by washing with an antiseptic solution, and lastly with pure alcohol. The trocar should be sterilized by boiling, or passing it slowly through the flame of an alcohol lamp. The emulsion must be prepared fresh, and sterilized. If a syringe is used for making the injection it should be one with an asbestos disc for the piston and kept in an aseptic condition. If a rubber bulb and rubber tubing is employed, these must be sterilized. The point where the puncture should be made in operating on the different large joints has already been described. The cardinal rule in all operations should be to select the shortest route from the surface into the different joints, and at a point where no important structures will come into the line of the proposed puncture. In injecting\* a tubercular abscess the puncture should not be made where the abscess wall is thinnest, but some distance from the most prominent point of the swelling, so that the puncture will be made through healthy skin, and not through tissues reduced in vitality from the long continued pressure from beneath. Before the puncture is made, the skin is drawn to one side, so that after the removal of the canula the puncture in the deep tissues may be subcutaneous.

The ethereal solution of iodoform should never be employed, as its use is attended by greater immediate and remote risks than if the iodoform is used in suspension in a non-volatile menstruum.

The best method of using the iodoform is a 10% mixture in glycerine or olive oil. The quantity of the mixture to be injected must vary somewhat according to the age of the patient and the size of the tubercular focus. From three drachms to an ounce is the average dose. In injecting a tubercular joint which contains fluid or a tubercular abscess, irrigation with a 3% solution of boracic acid should be employed until the fluid returns perfectly clear before the iodoform injection is made. If the joint or abscess cavity contains broken down tubercular products which can not be removed through a large canula, the joint or abscess should be freely incised, the interior scraped and rubbed out with iodoform gauze, wound sutured and then the injection made, a plan of treatment practiced with great success by Billroth.

In making parenchymatous injections the needle should be inserted in different directions without removing it completely, and the injection made at as many points as possible in order to saturate as large a territory as possible of the infected tissues. If the procedure is to be repeated the puncture is made some distance from the first so as to medicate a new area of tubercular tissue.

After the canula is withdrawn the puncture in the skin should be carefully sealed with a pledget of aseptic cotton and iodoform collodium. Mechanical diffusion of the injected material should be secured after the injection by kneading, compressing and rubbing the parts, and by making passive motion. The injection is not to be repeated oftener than every eight days to two weeks, and the treatment continued until the tubercular material has been removed and healing by cicatrization is in progress.

In the treatment of tubercular joints by iodoform injections, immobilization is only necessary if active motion of the joint is productive of great pain. In tubercular spondylitis with abscess, the iodoform treatment should be combined with the necessary orthopædic treatment. In tuberculosis of bones and joints, with a large caseous mass or a sequestration of considerable size at the primary focus the iodoform treatment can not take the place of mechanical removal of the infected and dead tissue, but is often of great value as a preliminary measure to prepare the way for a radical operation.

*Cases of Tuberculosis of Bones and Joints Recently Treated by Iodoform Injections in the Surgical Clinic of Rush Medical College.*—The most brilliant result of treatment by iodoform injections that came under my own personal observation was the case of tubercular spondylitis reported above. The local and general improvement was manifest after the second injection, and complete cure, not only of the enormous abscess, but also of the primary bone lesion, was realized in less than three months.

The cases reported below were treated in the clinic of Rush Medical College since April, 1891. In some of the cases the ultimate result of the treatment could not be ascertained, as the patients failed to report. A 10% emulsion of iodoform



in glycerine was the preparation used exclusively. The intra-articular injections were made with a two ounce glass syringe, which was connected with the canula, after withdrawal of fluid, or, in case the joint was irrigated with a solution of boracic acid after completion of this procedure, by a piece of aseptic rubber tubing which was tied firmly over the distal end of the canula and the nozzle of the syringe. Special care was exercised to prevent the entrance of air into the joint. As a rule, the patients were permitted to use the limb moderately during the entire treatment. An exception to this rule was made in the cases of tuberculosis of the hip joint and in affections of the knee-joint when the joint was much contracted.

In no case was the injection followed by suppuration, intoxication or any other immediate or remote untoward symptoms. As a rule, the pain following the injection was slight and of short duration. The injection was always followed by some swelling, which reached its maximum about the second day. Improvement of the joint lesion was always announced by a change in the character of the effusion in the cases in which this condition of the joint existed. If the joint or abscess contained tubercular pus, the first change noticed was gradual disappearance of the solid portion of the fluid, such as shreds of lymph and fragments of tubercular tissue, at the same time the fluid became more viscid, bearing a strong resemblance to thin mucus. As soon as this stage was reached the effusion disappeared speedily and permanently with contemporaneous improvement of all the remaining symptoms.

CASE I. Laboring man, æt. 27; has inherited a rheumatic tendency; presented himself for the first time in the clinic April 23, 1891; general health unimpaired; no signs or symptoms of pulmonary tuberculosis. Nine months ago he experienced pain on the inner side of the right knee joint. This pain was not constant, but was always aggravated by active exercise. Five months later the joint became swollen. When first examined, the joint was uniformly swollen, movements of limb unimpaired; upper recess of synovial sac quite prominent, fluctuation distinct; no tender points over condyles of femur or head of tibia. Primary synovial tuberculosis with hydrops was the diagnosis made at the time.

The joint was punctured with a medium sized trocar and about four ounces of a turbid synovial fluid, in which small flakes of lymph were suspended, were removed. The tapping was followed by irrigation of the joint with a 3% solution of boracic acid until the fluid injected returned perfectly clear. One ounce of iodoform emulsion was injected. The patient was advised to use the limb moderately. During five weeks the same procedure was repeated three times, and at each successive tapping the fluid removed was less in quantity and more viscid. When the patient was seen again after the fourth injection the joint presented a normal appearance, no effusion, and thickening of capsule nearly disappeared; motion of joint nearly normal. As the patient has not reported since that time it is fair to assume that he has completely recovered.

CASE II. Boy, *æt.* 8, with good family history, entered the Presbyterian Hospital Oct. 25, 1890, suffering with hip disease. The disease commenced soon after an injury which he received in April, 1889. Rest in bed and extension by weight and pulley was the treatment employed. Under this treatment the pain subsided, but the swelling and tenderness remained stationary. During the month of May three injections, from two drachms to half an ounce of the emulsion each time, were made into the joint. As it was almost certain that the head and neck of the femur were the primary seat of the inflammation in this case, I made it a point to penetrate the neck of the femur deeply with the small trocar in order to attack existing osseous foci by the same treatment. The emulsion was first thrown into the substance of the bone, and later, after withdrawing the canula as far as the surface of the bone, into the joint.

Several days after the last injection the pain became suddenly aggravated and the limb shortened in spite that extension was kept up uninterruptedly, at the same time the limb was rotated inward. It was now decided to resect the joint. The operation was performed June 7. The great trochanter with the muscles attached to it was cut away from the shaft at the base of the neck of the femur with a chisel, and after the resection of the joint was replaced and fastened to the shaft with two catgut sutures. Inspection of the joint now explained the symptoms which had developed recently so suddenly.

The head of the femur, partially destroyed, had slipped out of the acetabulum and was resting upon its upper brim. A number of foci were found in the neck of the femur in close proximity to the head; the joint was filled with granulations. No signs of caseation. The granulations were firm and of a bright red color, and I have no doubt



had this accident not occurred the parenchymatous and intra-articular injections would have resulted finally in a cure. The neck of the femur was divided at its junction with the shaft with a broad chisel and removed with the head. The capsule was extirpated, and the granulations lining the acetabulum scooped out with a sharp spoon. Extension in abducted position was continued for several weeks. Primary healing of the wound and only very slight shortening, with leg in excellent position.

CASE III.—Farmer, *æt.* 53, with a family history of tuberculosis, came to the clinic to be treated for tuberculosis of the wrist joint of three years' standing. General health fair; muscles of arm atrophied; hand slightly flexed; arm in position half way between pronation and supination. Swelling extended over the entire wrist joint, and presented all the characteristic clinical features of tuberculosis of this joint. During the course of five weeks he received three iodoform injections, the quantity of emulsion used each time being sufficient to distend the joint fully. After the second injection the swelling and pain began to subside, and four weeks later the joint was practically cured. The injections were always made below the styloid process of the ulna or radius, from which point the trocar was made to traverse the entire joint from side to side; the injection was made slowly and at different points, as the canula was withdrawn.

CASE IV. Girl, *æt.* 4, with good family history, was brought to the clinic June 25, suffering from typical tuberculosis of the right knee-joint. The disease commenced five weeks ago with pain and lameness. No evidences of tuberculosis in any other organ; general health fair; knee-joint slightly flexed, but only moderately swollen; no effusion in joint; capsule thickened, and upper recess of synovial sac evidently the seat of fungous granulations. Tenderness over the internal condyle of the femur suggested an osseous origin of the intra-articular inflammation. The knee-joint was punctured but no fluid escaped. In order to ascertain whether the whole knee-joint could be medicated by intra-articular injection, boracic acid solution was forced into it from a fountain syringe until the whole joint was fully distended; it held about two ounces. Half an ounce of iodoform emulsion was then injected. The joint became more swollen, painful and tender after the first injection. The same quantity was injected July 11, August 4, and September 1.

At the present time the position of the limb is normal, motion of joint fair, thickening of capsule greatly diminished and tenderness over condyle less.

CASE V. Girl, *æt.* 7, was admitted into the Presbyterian Hospital, March 24, 1891, with well-marked advanced tubercular disease of hip-joint, of two years' duration. The little patient is anæmic and emaciated. Treatment by extension and parenchymatous and intra-articular injections of iodoform. March 24, April 28 and May 28, half an ounce of iodoform emulsion was injected into the neck of the femur and hip-joint. At first the patient appeared to improve, but later her general condition became gradually worse, and an abscess formed. Resection of the hip-joint was made July 16. September 9 the wound was nearly healed, and the general condition much improved. The resected specimen contained a number of caseous foci which at least in part would explain the failure of the iodoform treatment.

CASE VI. Girl, *æt.* 7, child of healthy parents, has been suffering for two months from chronic inflammation of the knee-joint. Swelling has only recently appeared; limb is flexed at an angle of  $140^{\circ}$ ; pain aggravated on motion of the joint; no fluctuation; tenderness over condyles of femur.

DIAGNOSIS.—Dry fungous synovitis with osseous foci in condyles of femur. Half an ounce of iodoform emulsion was injected into the joint and the thickened capsule at six different times from March 18 to July 28.

August 13, the joint was carefully examined, and the appearances were such as to warrant the assumption that the joint lesion was cured. Pain and tenderness on moving the joint, as well as in the condyles of the femur, had disappeared. The limb was now easily straightened, while the patient was under the influence of an anæsthetic, and immobilized in a plaster-of-Paris dressing.

September 11, splint removed; position of limb satisfactory; further treatment, consisting of massage, passive motion, directed. Patient can walk without the aid of mechanical support. Pain, tenderness and swelling have disappeared completely.

CASE VII. Laborer, *æt.* 19, good family history. Two years ago had an attack of peritonitis, which was followed by pain and swelling of one of the wrist joints. An abscess formed, and was opened four months after commencement of joint affection. An operation was made a year ago. When patient was presented for the first time in the clinic, the wrist joint was very much swollen, and skin over it for some distance œdematous. Hand flexed and forearm pronated. Fistulous openings led to carious bone; lower end of radius and ulna enveloped; suppuration slight; general health materially impaired. Evidement of joint; wound packed with iodoform gauze, and forearm,

as far as base of fingers, supported by a well padded anterior splint. The sinuses were injected with iodoform emulsion twice a week for two months. At this time the wound was healed completely, and the patient has secured good use of hand, being able to perform manual labor.

CASE VIII. Laborer, æt. 20; family history good. For a number of weeks patient has experienced pain in left knee joint, which was followed by swelling four weeks ago, since which time he has not been able to follow his occupation. At the time treatment was commenced, August 11, the knee-joint was distended with fluid, patella raised at least half an inch from anterior surface of condyles, upper recess of joint very prominent, and conspicuous bulging on each side of patella. Diagnosis: Primary synovial tuberculosis with hydrops of joint. General health not much impaired. Joint was tapped, and ten ounces of turbid synovial fluid, mixed with shreds of lymph, removed. The joint was washed out repeatedly with a 2% solution of boracic acid, until the fluid returned perfectly clear, when, by compression, the joint was completely emptied and an ounce of iodoform emulsion was injected. Next day the joint was swollen as much as before the tapping. The patient returned August 25, and stated that the treatment had proved beneficial to him. The joint was again tapped, but only half the quantity of fluid removed as the first time. The fluid removed contained no shreds, and was clearer and more viscid than at the first tapping. The second injection produced less swelling and pain than the first. Two weeks later the swelling had completely disappeared, thickening of capsule less, and the patient has since recovered almost perfect use of limb.

CASE IX. Brakeman, æt. 22, was admitted into Presbyterian Hospital April 15, 1891; tuberculosis not hereditary in his family. About five years ago patient experienced a sudden pain in left knee, which was followed very soon by swelling and local heat. Since that time the knee has been injured on three different occasions, and each accident was always followed by aggravation of symptoms. About 18 months ago the pain diminished, but patient was unable to walk without the aid of crutches. The patient is anæmic and considerably emaciated; knee-joint swollen and flexed; no effusion in joint, but capsule thickened throughout; circumscribed point of tenderness over inner tuberosity of tibia. Careful search reveals absence of tuberculosis in other organs. Diagnosis: Tubercular osteo-arthritis with a probable focus in the inner tuberosity of tibia. Two iodoform injections were made two weeks apart, but as no improvement followed typical resec-

tion of knee-joint with preservation of patella was made May 3, 1891. The whole synovial membrane was found converted into a granulation mass, and capsule of joint much thickened. The base of two triangular sequestra in the head of the tibia projected into the joint. The articular surface of the two fragments of necrosed bone was much worn, and presented a polished surface. Primary union of wound and bony consolidation of resected ends in six weeks. The inefficacy of iodoform treatment was explained by the pathological conditions revealed at the operation. Secondary tubercular synovitis following extensive necrosis from occlusion of an artery by a tubercular thrombus or embolus is not amenable to this kind of treatment. If in such cases this treatment is not followed by improvement after the second or third injection, resection is indicated and the operation should not be postponed.

It is my opinion that even in such cases the preliminary treatment by iodoform injections is of great value, as it brings the intra-articular structures in better condition for successful operative treatment. I regard intra-articular and parenchymatous injections of iodoform as the best preparatory treatment for the resection of tubercular joints in which this treatment does not meet the pathological indications.

CASE X. Boy, æt. 17, with a tubercular family history, applied for treatment in the college clinic, June 18, 1891. When 2 years old, symptoms of tubercular spondylitis in the dorsal region first developed. In spite of the usual treatment made use of for this affection an extensive posterior curvature formed. The patient, although 17 years of age, is not taller than a boy of 7 or 8 years. About 6 months ago a swelling was detected in the left iliac region which rapidly increased in size. The patient is very anæmic, and greatly emaciated. The curve involves at least eight or nine of the upper dorsal vertebræ. A fluctuating swelling reaching from Poupart's ligament to the costal arch, and extending to near the median line, was found on the left side. Diagnosis: Tubercular spondylitis of upper dorsal vertebræ, which has resulted in the formation of an immense lumbar abscess, which in all probability still communicates with the primary osseous lesion. The abscess was tapped in the lumbar region immediately below the last rib and six pints of characteristic tubercular pus were evacuated. The abscess was washed out repeatedly with a solution of boracic acid until the fluid returned perfectly clear, after which an ounce of iodoform emulsion was injected.

Between June 18 and August 5, tapping, irrigation and injection was repeated four times. At each tapping the quantity of fluid re-

moved was less, so that the last time not more than four ounces of a viscid opaque fluid were removed. Since then there has been no reaccumulation of fluid, and the general condition of the patient has very much improved. In its result the treatment in this case has proved equally satisfactory, as in the case of tubercular spondylitis described above. These two cases have satisfied me that the iodoform treatment will prove most beneficial in the treatment of chronic abscesses which develop in the course of tubercular spondylitis. The value of this method of treatment in such cases cannot be over-estimated inasmuch as little can be expected from operative treatment in tuberculosis of the vertebræ.

Dr. Ochsner, assistant to the chair of surgery in Rush Medical College, has kindly consented to follow these cases in the future, and make later a supplementary report. It is only by keeping such cases under observation for months and years that reliable statistics as to the ultimate results of this as well as any other method of treatment for tubercular affection of bones and joints can be obtained. The immediate effect of the treatment has proven highly satisfactory in my hands, and in conclusion, I can only urge its more general adoption by American surgeons.

#### CONCLUSIONS.

1. Parenchymatous and intra-articular injections of safe anti-bacillary substances are indicated in all subcutaneous tubercular lesions of bones and joints accessible to this treatment.
2. Of all substances so far employed in this method of treatment iodoform has yielded the best results.
3. The curative effect of iodoform in the treatment of local tuberculosis is due to its anti-bacillary effect and its stimulating action on the healthy tissue adjacent to the tubercular product.
4. A 10% emulsion in glycerin or pure olive oil is the best form in which this remedy should be administered subcutaneously.
5. The ethereal solution should never be employed, as it is liable to cause necrosis of the tissues overlying the abscess and iodoform intoxication.
6. Tubercular abscesses and joints containing synovial

fluid or tubercular pus should always be washed out thoroughly with a 3 to 5% solution of boracic acid before the injection is made.

7. Injections should be made at intervals of one or two weeks, and their use persisted in until the indications point to the cessation of tubercular inflammation and the substitution for it of a satisfactory process of repair, or until the result of this treatment has shown its inefficacy and indications present themselves of the necessity of resorting to operative interference.

8. If the treatment promises to be successful, symptoms pointing to improvement manifest themselves not later than after the second or third injection.

9. In tubercular empyema of joints and tubercular abscesses gradual diminution of the contents of the joint or abscess at each successive tapping, lessening of the solid contents of the fluid and increase of its viscosity are the conditions which indicate unerringly that the injections are proving useful and that in all probability a cure will result from their further use.

10. Moderate use of limb is compatible with this method of treatment provided the disease has not resulted in deformities which would be aggravated by further use of the limb; in such cases correction of the deformity should be postponed until the primary joint affection has been cured by the injection.

11. Parenchymatous and intra-articular medication with anti-bacillary remedies has yielded the best results in tubercular spondylitis attended by abscess formation and tuberculosis of the knee and wrist-joints.

12. This treatment may prove successful in primary osseous tuberculosis followed by involvement of the joint, provided the osseous foci are small.

13. Extensive sequestration of articular ends with secondary tubercular synovitis always necessitates resection, but preliminary treatment by iodoform injections into the affected joints constitutes a valuable preparatory treatment to the operation and adds to the certainty of a favorable result.

14. In open tubercular affections of joints, incision, scraping, disinfection, iodoformization, iodoform gauze tampon, suturing, and subsequent injections of iodoform emulsion as advised by

Billroth yields excellent results, and should be employed in all cases in which a more formidable operation can be avoided.

15. Balsam of Peru ranks next to iodoform in the treatment of tubercular affections of bones and joints and if the latter remedy for any reason cannot be employed or has failed in effecting the desired result, it should be given a fair trial if operative treatment is not urgently indicated.



THE MÜTTER LECTURES ON SELECTED TOPICS  
IN SURGICAL PATHOLOGY.

SERIES OF 1890-1.<sup>1</sup>

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LECTURE X.

MIXED AND SECONDARY INFECTIONS.

(CONTINUED)

SYLLABUS.—Mixed and Secondary Infection Complicating Erysipelas; Lymph-  
angitis; Variola; Cerebro-spinal meningitis; Infectious pseudo-rheumatism; In-  
fectious endocarditis, Erythema multiforme; Tuberculosis; Glanders; Anthrax;  
Syphilis; Gonorrhœa; The puerperal state; Other genito-urinary lesions.

ERYSIPELAS.

**A**MONG the earliest authors to describe the supervention of rheumatoid inflammation during erysipelas, was Trousseau, who regarded them as agreeing in this respect that their symptoms were metastatic, and were, after a fashion, interchangeable. In other words, that the one could, as it were, take the place of the other, or that they could co-exist; and then he speaks of a young man suffering from facial erysipelas, who was suddenly seized with rheumatic pains, who had often suffered from the former, and who, since the accession of the latter had developed an endocardial murmur, most all of whose

<sup>1</sup>Delivered before the College of Physicians, Philadelphia, March, 1891.

joints, even the smaller ones, were involved and who was a very sick man. As in the case of dysentery, the endeavor has been made to regard erysipelas as an external manifestation of rheumatism. Perroud was especially responsible for this view, and he found some reason for it in the frequent occurrence of a coincident cardiac affection; but this view has now no value, although it is well recognized that endocarditis is a frequent complication of erysipelas. That there is a form of rheumatoid arthritis consecutive to erysipelas we must accept, but it appears to have nothing except locality in common with a much more severe and disastrous joint lesion in the shape of pyarthrosis. It is impossible to disregard the biological fact that the specific parasitic agent in producing erysipelas, as in infectious endocarditis, is one of the well-known pyogenic streptococci. For a more definite reference to this organism and its proper position among other organisms, we must refer back to Lecture III. When we remember how common it is to have a superficial abscess or how, not infrequently, we have to deal with severer phlegmonous forms, we certainly ought to be genuinely surprised that so seldom we have to deal with the presence of pus in the bones or joints, or even in the nodes. For these cases we have scarcely to invoke the theory of a secondary or mixed infection, since we consider the streptococci of erysipelas of themselves sufficient to produce pus, although such is by no means their invariable action. Indeed the frequency with which positively distinct and undoubted manifestations of erysipelas occur, from which the specific organism can be readily cultivated, and yet without formation of a drop of discoverable pus, forms about the only argument in favor of a biological distinction between the streptococcus erysipelatis, and the streptococcus pyogenes.

Musgrave appears to have been the first to notice the coincidence between erysipelas and arthritis, and in 1709, in a work upon abnormal arthritism he mentions erysipelas as among the accidents which may determine this condition. Lorry speaks in the same sense. Joseph Frank mentions an arthritic erysipelas. Profeta classifies erysipelas among the symptomatic dermatoses of rheumatism and gout, and Pierre Frank, of Palermo, thought that suppressed gout might reappear in the

form of different cutaneous affections, particularly in that of erysipelas. Of course all these views are now attributable to the ignorance of that age concerning the nature of the disease, which was then considered as an ordinary dermatitis.

While of course its infectious character is everywhere recognized to-day the history of the disease shows that its contagiousness was suspected by Lorry in 1777, and definitely and forever established by Velpeau and Trousseau.

It is only proper also to make a distinction between cases where there has been a direct extension from the skin to the underlying synovial membrane, these being analogous to those where the disease spreads from the scalp to the meninges, or from the skin to the peritoneum, and those implications of joints which are at a distance from the part involved in the cutaneous manifestation. For instance Despres has described the case of a patient who had undergone an operation for cataract subsequent to which a violent erysipelas of the face developed. In this case pus was found in remote joints. Lawrence, Avery and Velpeau have noted the same distinction, and Volkmann mentions multiple pyarthroses which he separates sharply from embolic pyaemia, since they lack the clinical features of chills, temperature curves and other signs which genuine pyæmic cases present. When the disease is the result of direct extension, the prognosis is better than when it is of the latter general character. During the last Franco-German war a large number of patients in the Berlin barracks who had suffered from gun-shot fractures were seized with erysipelas, in consequence of which many of them died, sometimes of the disease itself, sometimes of a final pneumonia. Among 130 of these well marked cases, pus was found five times in the interior of the joints, over which the erysipelatous inflammation had spread. When we remember the anatomical fact that the joint cavities are practically enormous lymph spaces, it will be less difficult to appreciate the course of events in such cases as these. In other words, we have to deal first probably with a serous arthritis while the infection with pyogenic cocci is the secondary result.

Such a case as the following reported by Breusing is quite suggestive: An old man suffered from fracture of the neck o

the femur; after a while he developed an erysipelatous affection in the sacral region, which wandered down the left leg and in five days spread over the left knee; in twelve days he died. At the autopsy pus was found in this knee which connected with external bursae. Cultures made from the serous exudate taken from this same knee a week previous to the death proved to be pure cultures of Fehleisen's coccus.

In a clinical study concerning surgical infectious diseases, published in 1890 in Munich, by Fessler, he reports that an inoculation with a mixed culture of bacillus prodigiosus and streptococcus of erysipelas seems to produce more violent reaction upon the rabbit's ear than does the streptococcus alone, the reaction even proceeding to gangrene. It is not at all unlikely that some of the phlegmonous manifestations of erysipelas may be due to mixed infection after this fashion, although not necessarily with the bacillus spoken of here.

#### LYMPHANGITIS.

Verneuil, in a memoir read before the Academy in 1878, reported five cases in which a lymphangitis of the lower limb was followed by an arthritis or a hydrathosis of the knee. In one of these cases the collection of pus was so large and the phenomena so grave that amputation was proposed but refused. Drainage was then made, with antiseptic injections, but the patient died in a very short time, and at the autopsy the cartilages were found destroyed and the spongy bone saturated with pus. This patient entered the hospital suffering from some undetermined fibromatous condition with a gangrenous area on the back of the foot. Perhaps this is scarcely a typical case of its kind, since septic organisms had ready access from the necrotic area. On the other hand it is almost impossible to conceive of a lymphangitis not of microbic origin. Consequently it may stand, after all, as a specimen of its class.

#### VARIOLA.

But little is said in recent literature concerning the development of serious lesions of a surgical character consecutive to

small-pox. A large amount of what little has appeared upon it is met with in the writers of the early part of this century, about the latest distinct contribution to the subject being that of Bidder, relative to an epidemic of small-pox in Halle during 1870 and 1871, as the result of which several patients with purulent collections in and about the joints presented themselves in Volkmann's clinic. Here again, as was so universal, we find the same confusion of all obscure forms of joint trouble with rheumatic affections. Thus Brouardel mentions that he saw rheumatoid affections five times among 389 patients; they appeared during the stage of desquamation and he was able to convince himself that there was no pus present. An observation of Friedheim's, made during 1885, is of very great value. It concerns a boy, *æt.* 12, who was seized with small-pox, who, after it had disappeared, complained of violent pains and disability of the left arm and of the left hip. Even upon the next day it appeared as if the head of the humerus could be almost lifted out of its socket; there was no fluctuation; the left leg was strongly flexed upon the abdomen, and adducted. The trochanter was 4 cc above its normal position. Extension was applied. The spontaneous dislocation was reduced and the patient finally recovered.

The only joint manifestations of interest during the course of this disease are the arthropathies. Thus Rilliet and Barthez say that they have often observed a circumscribed phlegmasia about the joints, which were swollen, red and painful, resembling rheumatism in many respects. The inflammation involves one joint and passes rapidly to another, or it involves several at the same time, and then disappears after a few days, leaving no trace behind. Brouardel is rather of the opinion that this is a genuine rheumatism, since the periosteum of the long bones is often involved, and since endocarditis sometimes occurs. But a true suppurative arthritis involving several joints is common, and sometimes, according to Bidder, fragments of bone are evacuated, after which the joint recovers. These accidents occur most commonly during the period of drying up of the pustules or during convalescence.

Concerning the nature of these sequelæ Rilliet and Barthez think it is impossible to see, in the multiplicity of these phleg-

monous processes and their dissemination, even in their metastatic character, anything less than a general cause such as numerous French writers speak of as a purulent diathesis. Bidder observed suppurating joints five times in young children, suffering from variola, and in each there was coincident formation of abscesses. Bourcy rejects the theories of metastasis, and believes in a variolous intoxication as the determining cause.

Trousseau mentioned years ago that in cases of small-pox, joint inflammations apparently very easily took on a purulent character, and was of opinion that this peculiar disposition to suppuration was the result of a specific action. He distinguished between multiple joint inflammations of this character and true metastatic pyæmia, which latter begins usually on the 9th to the 14th day and at a time when the skin is beset with pustules. True pyæmia according to Curschmann (*Ziemssen's Hand-book*) appears to be a very rare complication. Two very instructive cases of purulent arthritis following small-pox were reported respectively by Guersant in 1834 and Thomas in 1835. The former case was that of a lad of sixteen, who having just recovered from pneumonia, was seized with small-pox. One joint after another was involved, and a severe conjunctivitis was added to his other troubles. Rigors set in with extreme emaciation and diarrhœa. He died four weeks after, and upon dissection pus was found in most of the affected joints as well as in the tendon sheaths. The second case was that of a young man, æt. 21, who on the 28th day of an attack of dysentery developed variola. He also died with multiple pyarthroses, and pus was found in numerous joints. The cases reported by Bidder appeared mostly as periarticular rather than intra-articular collections of pus, and partook somewhat of the character of suppurative epiphysitis. He is rather of the view that the deeper lesion in such cases is a result of extension from the overlying skin, inasmuch as the joints whose cavities are nearest the surface are mostly affected. The occurrence of acute abscesses in the bones has also been noted, especially by H. Fischer. When we consider the mass of pustules which cases of this character present, we have reason to wonder that suppuration in deeper tissues is not the rule rather than the



exception. Guttman found pyogenic staphylococci in the contents of the variolous pustules and vesicles as well. Garré succeeded in cultivating streptococci from the juices of various organs, from which it appears that pyogenic microbes are carried in the blood to all parts of the body, and we are compelled to fall back on the view that, as a rule, the tissues even when poisoned with this disease do not furnish favorable soil for their development.

Neve, speaking of the confluent variety of small-pox, says that the formation of boils and abscesses is common, and that it is not strange that, in a suppurative disease like variola, symptoms of a pyæmic nature should occur. Inasmuch as we do not yet know the specific germ of small-pox, we are unable to state whether it possesses pyogenic properties, or whether the pustules which characterize the disease are the result of mixed infection or not. Presuming that the latter is in many instances the case, it is easy to see how the poison may be absorbed by the lymphatics, and passed on to the small veins, from which it may be scattered far and wide; and undoubtedly many of the abscesses met with in this disease, as well as the cases of necrosis, may be explained as metastatic phenomena. Of thirty-six cases of bone and joint disease commented on by Neve, four were cases of alveolar necrosis, twenty-six suffered from joint disease, and in twelve one or more epiphyses were affected. The upper extremity was the more commonly involved, which he explains by the fact that most of these patients were children, and that little children use their arms more than they do their legs.

The occurrence of orchitis has been noticed in various febrile affections. Velpeau and Berand have described a form developed during small-pox, and Trousseau speaks of it at some length.

#### CEREBRO-SPINAL MENINGITIS.

It seems to be fairly well established now that this disease, certainly its epidemic form, is of microbic origin, and this being the case we need not be surprised to find evidences of secondary infection, providing only that patients live long enough to develop them. As a rule, however, death occurs



with such rapidity that time for secondary symptoms is scarcely offered. Nevertheless, the studies of such authors as Grisolles, Laveran and others show that we do have at least articular complications, and that from the fifth to the eleventh day, if life persist so long, acute arthritis may occur, often with supuration. The larger joints are those commonly attacked, including probably those of the vertebral column. In this fluid according to Cornil and Babes, bacteria are always found.

#### INFECTIOUS PSEUDO-RHEUMATISM.

This forms a chapter in the monograph of Lapersonne, who describes under this term certain cases of usually multiple synovitis or arthritis whose prime cause it is impossible to discover. They come on sometimes as the result of fatigue following trifling injury or burn, sometimes after a sore throat, even mild, and sometimes without any appreciable cause. They are preceded or accompanied by constitutional symptoms, which are sometimes mild like nausea and malaise, and sometimes violent like delirium, severe headache, etc. Locally these cases present two forms, the pyretic and the apyretic. Under this term he includes quite a number of fatal cases in which, upon autopsy, were found all the ordinary anatomical manifestations of an infectious disease. He insists upon their separation from typhoid fever, from ulcerative endocarditis, and above all from acute articular rheumatism.

#### INFECTIOUS ENDOCARDITIS.

Only within thirty years has the individuality of this disease been recognized. In the interval since Rokitansky and Virchow dispersed all doubt as to the existence of acute ulcerations of the endocardium, numerous researches have been made, and the names of Pelvet, of Klebs and Weigert, of Prudden and Osler, along with a host of others, must always be prominent in the history of the subject. That the disease deserves the characterization often given to it of *malignant* is well known. It is, in fact, an infectious disease with especial localization in the heart, the

term cardiac typhus, given to it by some, being very expressive. Although so often apparently spontaneous, it is in fact usually a secondary disease; in large measure it is a secondary infection. Its parasitic nature is of course placed beyond a doubt, although we have learned that the organisms which may cause it are the common and well-known pyogenic cocci, their virulence in these cases being as intense as in cases of infectious osteo-myelitis. When we consider the peculiar location of the lesion in this disease, we shall have no difficulty in appreciating the readiness with which metastatic complications may arise; the wonder is rather that they do not always occur. The arthritic manifestations are usually of a pyæmic character, although even at the beginning, as Trousseau pointed out, there are frequently severe joint pains. Abscesses may form very rapidly, while around the joints there occurs a diffused œdema which is simply another sign of the intensity of the trouble.

The specific or infectious form of endocarditis is perhaps to be separated from a non-septic form of acute endocarditis, which is perhaps of acute rheumatic origin, in the course of which we have, however, perhaps at the same time, multiple hæmorrhages and articular effusions, which latter, according to Strümpell, are of a serous and not a purulent character.

#### ERYTHEMA NODOSUM SEU MULTIFORME.

By some writers this has been classed among the infectious diseases. Trousseau ranked it among the eruptive fevers. Hardy considered it a manifestation by itself, to be compared with post-scarlatinal rheumatism. Other French writers consider it as a specific disease whose external expression is the eruption. In 1886 Villemin reported to the Academy of Medicine eleven cases of so-called infectious erythema. In his fourth case he had noticed severe arthritic manifestations in a number of joints, which he considered as connected with the primary disease. The writer has had no experience with complications of this character in this somewhat rare disease. A case occurring recently in his practice, however, is worthy of mention in this connection. A middle aged man of rather

#### TUBERCULOSIS.

free habits, was operated on for numerous and deep strictures of small caliber. The first week after the operation passed without especial incident. With the beginning of the second there appeared the multiform manifestations of this condition, which seemed to be exaggerated by each of two successive soundings with a large sized steel sound. Finally the eruption took on a nodose character in severe form and gave rise to some apprehension for a few days. There were no joint complications in this case, and the erythema itself must be considered as secondary to the surgical intervention. I find that dermatologists speak of the occasional supervention of this disease after surgical operation or irritation. Nevertheless, if it be in any sense a specific disease, one can see how from an infected and unhealthy urethra, abundant opportunity for the entrance of the germs is offered.

#### TUBERCULOSIS.

So much has appeared of late on the matter of tuberculosis in its surgical and pathological relations, that the space assigned to it in these lectures will intentionally be made small as compared to its importance. To only two or three phases of the subject shall I invite your attention. I desire to make it clear, however, that tubercular mixed infection may be of two kinds: First a condition in which we have a secondary pyogenic infection of a primary tuberculous focus, and, second, a tuberculous infection of a previously healthy area, or of a wound whether healing kindly or suppurating. I do not know that anywhere proper and distinctive attention has been called to these two manifestations. Instances of each of them must be extremely common, and I need but to illustrate them to you to be sufficiently explicit.

Let us take first a primary tubercular infection in the lungs. Lung texture previously normal has become infected, and in consequence is studded with few or many miliary tubercles which later coalesce and form what we call a tubercular nodule. Certain physical signs indicate this state of affairs. A little later we have a secondary infection of this nodule by pyogenic and saprophytic organisms, the result of their action

being the formation of an abscess or as we say a lung cavity. This abscess may be miliary in size, or may produce a cavity as large as a hen's egg. This occurs in the lungs; its counterpart may be met with in any of the viscera or in the glandular system.

Take now a more distinctively surgical view of the same character of lesion. From some cause which it is not necessary here to discuss, the cancellous tissue in the neighborhood of an epiphysis becomes infected, miliary tubercles form, and there results that peculiar proliferation of tissue which the Germans call fungoid, and which we may speak of as infectious granuloma. As this increases in amount it erodes away other tissues and so advances in other directions, now perforating a joint, now boring through the periosteum and soft parts to appear at the surface by a livid purple area, after which complete perforation of the skin may follow; or tunneling beneath strong fasciæ, extending always in amount, and causing irritative hyperplasia in its vicinity, whose combined external manifestations are constituted by more or less swelling. It is frequently possible to find or to cut into such tissue at a time when it shall present nothing more than is described above. Up to this point we have a primary tuberculous lesion, but the clinical or pathological picture is liable to change at any time, and in addition to the above we then have all the added signs and symptoms of rapid or slow suppuration; all of which means a secondary infection by pyogenic or putrefactive organisms, while in the pus which may be later evacuated from such a focus tubercular bacilli may or may not be found, this depending in large measure on whether the collection be recent or old. These are illustrations of the first form of tubercular mixed infection.

Illustrations of the second are, perhaps, a little less familiar to those not engaged in surgical practice. Let me adduce a few illustrations.

A child originally healthy suffers from scarlatina. As a consequence of this he has purulent otitis with destruction of the membrana tympani, and exposure of the cavity of the middle ear to the outer world. The case goes on for an indefinite time as one of this character, when, later, tubercular infection

### *TUBERCULOSIS.*

takes place, in consequence of which we have specific caries of the bone with perhaps tubercular meningitis and death. In this case we might legitimately speak of the tubercular feature as constituting a tertiary infection.

Again, it is well known that dental caries is due to the specific action of several forms of micro-organisms, whose biology and properties have been illustrated by Prof. W. D. Miller. A tooth, which has been more or less destroyed by such agencies, permits a secondary tubercular infection to take place, more probably around it than through it, in consequence of which we have the well-known enlargement, always tubercular, of the cervical or sub-maxillary lymph nodes, in whose case again a tertiary infection occurs, this third time with pyogenic organisms, and now we have an abscess in the neck.

Again, a patient suffering from secondary or tertiary syphilis develops specific ulcerations in the nose or mouth. It is very possible for him to suffer from tubercular infections of these lesions before they heal, in such a fashion that he may recover from the syphilitic while being still contaminated by a tubercular lesion. In some such way as this undoubtedly many cases of combined syphilis and tuberculosis do occur.

Once more, let me quote a recent case of my own as serving as an excellent example: A strong and perfectly healthy man of excellent antecedents sustained a railroad injury of such a character that I was compelled to make a resection of the elbow, and the laceration of tissues was such that it was impossible to so perform it as to get recovery without necessity for granulation and consequent discharge of puruloid material. Necessity compelled the placing of this man in a small ward where were several other patients who were suffering from tuberculosis. This wound made rapid and favorable progress for some three weeks, when suddenly its aspect changed, its granulations became œdematous and it took on every aspect of a tuberculous ulcer. I deliberately watched it for a little while, and then made a second operation which comprised a scraping out of all infected tissue and the restitution of the parts to an aseptic condition. He was then sent out of the hospital and made rapid and complete recovery. Examina-

tion of the suspicious tissue removed showed tubercular bacilli present.

Another case, is that of a perfectly healthy young lady, who suffered from ankylosis of one elbow due to severe inflammation some years previously. Her physical condition and constitutional appearance left nothing to be desired in this direction. I resected her elbow, and the wound completely healed with a very little suppuration, to subsequently re-open at two points and display every local evidence of tubercular disease. In her case I cannot trace the source of the infection; in the previous case I can.

But why repeat, in what must be wearisome detail, examples of what everyone sees daily, though he may not attach sufficient importance to, or see the facts in their complete illumination. For my own part this topic of mixed and secondary infections consecutive to tuberculosis is perhaps the most important touched upon in this list because, largely, it is the most common. When I look over my own case books I find that from 20% to 25% of my cases concern this protean malady in its surgical relations. And others, like König, for instance, report that nearly 35% of their clinic cases are of the same nature. Do not such figures give it an overwhelming importance? And nevertheless are not the few instances which I have adduced as illustrative as a larger number?

Inasmuch then as I aim in these lectures only to be suggestive and illustrative, realizing that the time at hand permits nothing more, I must pass on; stopping only to remind you that the bones and joints are so freely spoken of during these remarks for the double reason that they afford as good examples of such lesions as any parts, and because they so especially interest the surgeons.

#### GLANDERS.

Clinical experience, especially that of veterinary surgeons, leaves no doubt as to the articular or secondary complications of this disease, whose contagious character has been recognized since the beginning of this century. Since the contagious nature of the disease was proved a few writers have in-



sisted, and with reason, upon the occurrence of articular complications, and Bonnet in his treatise has given a characteristic example. Elliotson has noted the presence of pus within the knee, and several times the knee, hip, shoulder and elbow have been found involved. Suppurative tendo-synovitis has also been met with, especially underneath infected skin. These complications are more common after acute glanders than after the other forms. A genuine polyarthritis much like that of acute rheumatism, not going on to suppuration, has also been observed. These are all secondary infections, save possibly the last named.

## ANTHRAX.

If we are to accept without question the opinion of Davaine and Pasteur, articular manifestations do occur in the course of this essentially infectious disease, although they are certainly rare; but we fail to find report of a single case where this is established without a doubt. A case quite suggestive, however, is reported by Chassaignac in his treatise on suppuration. It concerns the case of a young man, *æt.* 34, previously well, who contracted malignant pustule from the carcass of a sheep. Multiple pustules appeared upon the forearm and hand, and for their relief repeated cauterizations with the actual cautery were practiced. A little later swelling and elastic tension were observed upon the lateral aspect of the trunk, and there were fever, general malaise and peculiar pains about the joints, which latter swelled and acted as if affected with acute rheumatism. The patient made a slow recovery without secondary suppurations. Bollinger also has described certain cases of about the same character, from which it seems to me that the occurrence of mixed, if not secondary, infection is possible in these cases, although very rare.

## SYPHILIS.

Syphilis stands in a somewhat peculiar position in this list of diseases since its manifestations which concern us here are usually connected with that form of neoplasm which is prac.



tically an infectious granuloma. Of course, the syphilitic patient by virtue of whatever cachexia he may manifest is the more liable to suppuration on slight provocation than the healthy individual. Furthermore, by virtue of the many ulcerated lesions which these patients present, the path for secondary and pyogenic infection is widely opened. Of course, too, we are yet ignorant of the infectious agent in this disease. So far as we now know, however, there is no clinical fact leading us to believe that this agent, whatever it may be, can ever be pyogenic when uncontaminated. In this respect it appears to differ from the tubercle bacillus, since abscess formation and breaking down are common in syphilitic and tubercular gummata alike, and there is every reason to think that the former are invariably, and the latter, at least most commonly, the result of mixed infection with pyogenic or perhaps saprophytic organisms.

As far as the joints are concerned it is not often, at least, that we have a true syphilitic arthritis, and a suppurating joint in an active case of syphilis must probably always be due to mixed infection. A hundred years ago John Hunter declared that he had never seen constitutional syphilis attack the articulations, and this was at a time when venereal diseases were sadly confounded.

On the other hand, in 1853 Richet claimed that syphilis alone could provoke synovitis and articular ostitis in subjects who presented no sign of scrofula. Still later Chomel spoke of hydrarthrosis and hyperostosis of joint-ends as exceedingly rare manifestations of syphilis; but the infectious arthritides of syphilis were well treated of by Lancereau, after him by Fournier; and still later by Schüller, Volkmann, Mracek and others. But the non-suppurating lesions of late syphilis have no interest for us here, and we must close this short reference to the subject with the repetition of the statement that suppuration in these cases whether occurring in the brain, in the liver, in the epididymis or in joint cavities, is always the result of a mixed or secondary infection.

## GONORRHŒA.

This disease belongs among those infectious processes which often give rise to joint inflammation as well as disturbance in the bones. Its most common arthritic complication is, perhaps, the most frequent sequel of any that have been noted among the infectious diseases. In time past the French authors have made a very determined effort to group this disease among those of constitutional character. How earnestly they have worked in this direction may be seen in the writings of a large number; for instance, Pidoux has endeavored to show that gonorrhœa is a constitutional disease because of the pallor and facial expression, the rapid emaciation, the discoloration of the skin, occasionally noted, and other such insignificant features.

That there is in these cases a disturbance of the general system, or a sympathetic affection of functions, may be easily granted; but the endeavor to show the disease is *per se* of other than local character finds now-a-days very few if any sympathizers. Its last claim to this regard has been taken away from it by Neisser's discovery of a specific micro-organism which is capable of attacking only a very few mucous membranes. That arthritis is by no means the only surgical sequel is shown by the occurrence of such remote and inexplicable disturbances as iritis, which may occur without a secondary affection of the conjunctiva, while a form of conjunctivitis is known which does not partake of the purulent character. According to statistics presented by Nolen, 116 cases of gonorrhœal arthritis were accompanied by a conjunctivitis of the lids and bulb, or serous iritis, or by both. That some constitutions are much more easily affected than others is as true of this disease as of every other infection, but we are by no means prepared to accept that which the French have spoken of as the blennorrhagic diathesis.

The relations between blennorrhœa and gout or rheumatism were perhaps first alluded to about a century ago by Swediaur and Hunter, or even before them by Baglivi. The school of the Midi, the works of Ricord, of Cullerier and even of Velpeau, put the question upon a scientific basis, while the articles of Grisole, Ravel, and especially the chapter which Bonnet devoted to it in his work on the Joints, gave the topic an identity of its own which has still later assumed yet greater proportions.

Literature concerning the gonorrhœal joint complications is most extensive, and the conflict of opinion concerning their character has been at times almost fierce. Nolen, for instance, studying the cases above referred to, 116 in number, takes the ground that there is no reason why this affection should be separated from polyarticular rheumatism, and there being no reason why a rheumatic individual may not suffer from the local disease, one may appreciate how up to a certain point it is possible to have something that might be termed gonorrhœal rheumatism; but that the disease usually alluded to under this name has something in it essentially different from rheumatism pure and simple, is definitely proven by such a discovery as perhaps Petrone was the first to make, viz: of Neisser's gonococcus in the joint fluids from such a case. The arthritic complications of gonorrhœa, as of most of the infectious diseases, comprise a trifling serous effusion, a catarrhal form and a genuine purulent form. In Nolen's cases he found arthralgia seven times, hydrarthrosis twelve times, serous synovitis sixty-four times, a purulent condition twice and arthritis deformans six times. These joint complications occur usually in younger patients, æt. from 20 to 30, and almost always in men. Only urethral or vaginal discharges lead to the complication, balanitis and posthitis never. Some authorities take the ground that arthritis never occurs in men unless the membranous portion has been involved; also, and I think with reason, that only the truly specific forms of blenorrhœa are likely to be followed by these results. One peculiarity seems to separate these troubles from the essentially rheumatic, and that is their great tendency to recurrence. Volkmann saw one individual who had joint complications after each one of seven local attacks. Frerichs even goes so far as to say that this commonly harmless disease may lead to death, but death as it were of a suicidal character. Joint symptoms set in most commonly during the second week, although sometimes not until all local symptoms have disappeared. The true arthralgias are often complicated with equally painful myalgias and ostealgias. The knee and the ankle are most commonly involved. Sometimes we have such a polyarthritis as to constitute a verisimilitude to a true rheumatic attack. Occasionally even the tendon

sheaths and the bursæ take part in the disturbance, and to tenderness and sensitiveness in the tendons is added a swelling of the bursæ.

More serious and lasting disturbance than a temporary arthritis is by no means unknown. Complete ankylosis is rare, but painful joints whose function is long disturbed are common. Trendelenburg had recently to resect an anchylosed elbow thus stiffened, and he mentions a case from Langenbeck's clinic in which most of the joints, even these of the vertebrae, had become anchylosed to an extraordinary extent. With mere serous effusions, although they constitute a majority of these cases, we have in this place nothing special to do, but as already seen a true catarrhal inflammation is sometimes met with. Whether here we have to do with an unusual manifestation of activity on the part of the gonococci, or whether with a mixed infection, it has been in time past difficult to state; but as remarked in Lecture III, Neisser's diplococci are not known to have by themselves any pyogenic power. This would appear to be proven by a series of observations like that of Petrone, which have been repeated by numerous others, myself included. In the clear or almost clear sero-fibrinous effusion we have found these diplococci, yet never any pus unless other organisms were present. On the contrary when pus has been found other organisms are always present, *i. e.*, staphylococci and streptococci. There is reason to think that this is the case even in the urethra, which is never, at least in individuals subject to infection, free from the common pyogenic forms. In the seropurulent forms of joint effusion, we have apparently to deal with an infected fluid quite similar to that existing in a case of sero-purulent pleuritic effusion, which is capable of absorption, at least of the fluid portion, with death of the active organisms, and without serious damage to the enclosing membrane. But we have a more distinctly purulent form than this in which one or more joints fill up with clear pus. If this form be monarticular the patient may recover with function very seriously impaired or totally lost; if polyarticular it is usually fatal, the case then being indistinguishable from one of true pyæmia. One such case I reported in some detail in the *Journal of Cutaneous and Venereal Diseases* for December, 1888,

and Nolen refers to four similar cases. Fournier reports a pyarthrosis of the elbow, which ended fatally, and Eisenmann and König each saw a case in which a purulent gonitis led to death from pyæmia. Holst treated a case in which an immense effusion in the knee joint disappeared for the most part by absorption, but brought about the pyæmic condition to which the patient succumbed eleven weeks after. Prichard incised an immense abscess on the outer side of the thigh, which was the result of a perforation of an empyema of the knee and had later to amputate the thigh. Wyschemirski also observed a polyarticular form of post-gonorrheal joint empyema which ended fatally. In the pus from one elbow Neisser's gonococci were recognized with the other cocci.

These various views have necessarily met with numerous unbelievers, many of whom have charged that the microbes of the articular fluid have about them nothing specific, and that their discovery depends in large measure upon the time at which the fluid is withdrawn for examination. As a matter of fact, however, Kanmerer has found them, and Bousquet, in 1885, demonstrated in the liquid from a sterno-clavicular joint thus affected, the specific cocci of Neisser.

With reference to the occurrence of gonococci in joint fluid, the true position to-day is, as nearly as we can arrive at it, as follows:

Neisser's cocci may be found in the joint fluid in any post-gonorrhœal synovitis, though they are not necessarily always found. They are regarded by Fraenkel as the etiological agents in producing serous iritis, and if he be correct they would appear by themselves to have the property of provoking only serous or sero-fibrinous effusions. Careful bacteriological investigations of fluid taken from the joints involved in a true rheumatic inflammation fail to reveal any organism at all; but so soon as in either case we find pus, we find also the truly pyogenic organisms. Furthermore, in all cases of non-specific urethritis in which Neisser's cocci are not found, and with which they have nothing to do, we have no tendency, so far as known, to joint complications. In other words post-gonorrhœal arthritis may be due to the specific cause discovered by Neisser, though just how we do not know. Whereas whenever pus be present it is, accurately speaking, a secondary



#### GONORRHOEA.

infection. It is no more difficult to understand how the pyogenic organisms may travel from the urethra to the synovial membrane, than how the gonococcus finds its own way thither. Explanation of this fact does not seem to have as yet been furnished, and if a monarticular form of either may occur, why not a polyarticular as well? The explanation of the pyæmia arising from urethral and peri-urethral infection requires nothing more than the occurrence of a local phlebitis, septic thrombi from which can easily produce the whole disturbance. That this is not excessively rare, in one form or other, is shown by the frequency with which writers have alluded to such complications as endocarditis and pericarditis.

Participation of the osseous system in post gonorrhœal cases is much more rare, in fact only two authors have alluded to them, Petrone and Fournier. The latter has described a form which corresponds very well with the periosteal complications observed after typhoid and influenza. He speaks of extremely sensitive swellings of the periosteum which last two or three weeks, and terminate, ordinarily, by resolution, although possibly by abscess. They are met with most commonly where the bones lie subcutaneously. Aside from such abscesses as may be met with in the bones following a true pyæmic complication, I am not aware that bone abscess or acute osteomyelitis has been noted.

So far as purulent arthritis is concerned, numerous reports show the extent of the destruction which may follow. Thus Prichard was compelled to amputate a thigh, while Eisenmann lost a patient from general pyæmia after a manner quite similar to that in my own case elsewhere alluded to. Landouzy has reported the following remarkable case: A female, æt. 17, suffering from gonorrhœa, was attacked with most severe pain in the shoulder and right sterno-clavicular joint. Both joints were intensely swollen and extremely sensitive to pressure or movement, while fluctuation was well marked. A few days after her admission to the hospital there occurred a synovitis of the right peritoneal tendons within their sheaths with contracture of the foot. The joints were punctured, and the patient finally recovered, but with most marked secondary atrophy of



the muscles of the leg and those of the thorax and shoulder on that side.

This view that certain individuals produce pus with less provocation than do others was for a time made a seductive one by the talent of Lasegue. According to this view gonorrhœal rheumatism is a form of pyogenic rheumatism, and the joint lesion is an expression of an attenuated or mitigated pyæmia. This view was adopted by Guerin, and was defended by such English writers as Paget, Holmes and Barwell, and within ten years by Talamon. Another view somewhat similar was that during an attack of septic urethritis the patient suffered from a transient diathesis such as all individuals with genito-urinary diseases manifest, or a cachexia resembling that of syphilis, in the course of which not only the joints but the viscera, the whole economic system in fact, were most susceptible. It was supposed to be somewhat analogous to that which has been observed during scarlatina. This view was defended especially by Loraine.

The visceral complications of gonorrhœa are less often alluded to, but are unmistakable. Nolen found cardiac lesions in 15 out of 116 cases of gonorrhœal arthritis, and analogous effects have been reported by Peter, Fournier and by others. Leloir has reported, for instance, a case of acute pericarditis in connection with a case of gonorrhœa in a young man. The case was very severe and was accompanied with intense pain in one knee, along with which, however, there was very little swelling in the joint. Of late several French theses have appeared bearing on the subject of cardiac complications of gonorrhœa. For instance Morel has reported several cases of acute pericarditis and endocarditis accompanied by all the serious disturbances characterizing these complaints, as well as severe joint complications, and his paper is well worth careful reading. He comes to the following conclusions: First, that gonorrhœa can be complicated by inflammation of the serous membranes of the heart as well as of the joints; second, that so-called gonorrhœal rheumatism, like the common rheumatism, may affect the heart even at the outset; third, that certain septicæmic accidents may give rise to these cardiac complications; fourth, that these latter may be very rapid and

terminate fatally, although more commonly they are the causes of certain chronic lesions; fifth, that the treatment consists in first curing the gonorrhœa, and then combating by common measures the complications.

So also Marby, in a long paper on blennorrhagic endocarditis has reported a number of cases, and has drawn conclusions which do not differ materially from those already alluded to. Most of his cases were observed in the service of Poucet.

Gluzinski has diligently studied the ætiology of post-gonorrhœal endocarditis and recurring pericarditis of which he has brought together thirty-one cases. He appears to see a relationship between intensity of the original gonorrhœal process, and that of the cardiac symptoms, and he lays great stress on the difficulty of deciding whether these cases are a genuine mixed infection or a truly specific one.

It would seem that these cases of complications of gonorrhœa are to be widely separated from certain disastrous surgical sequelæ of operations on the urethra made necessary by lesions of long standing. I know, for instance, of a man who had an old and somewhat deep stricture of medium calibre, upon whom a sound was passed without causing extensive pain or any alarming sign at the time, yet that night he was seized with a severe chill, and died within a week of some positively septic condition. Such cases as this, and many similar may be found in surgical literature, are undoubtedly to be explained by a minute lesion of the mucous membrane with infection of the exposed raw tissue by one or more of the forms of pathogenic and septic organisms, which abound in the urethra under such circumstances, as is well known to all who have studied it bacteriologically. To such infection succeeds septic phlebitis of the peri-urethral and peri-prostatic vessels, than which nothing can be more favorable for purposes of general infection. Such cases as these are to be studied as secondary infection after a fashion, but not after just the fashion to which I am devoting myself at present.

#### THE PUERPERAL STATE.

Inasmuch as no essential pathological distinction can be made between the various conditions included under the name puerperal

fever, and septic complications of any ordinary wound or injury, it is impossible to make any minute distinction between the various infections which may follow this dreadful malady. Puerperal fever is essentially either a post-*puerperal* septicæmia or pyæmia, and inasmuch as the septic infection in one case follows local channels, or in the other assumes the metastatic rôle when we have to deal virtually with the same lesions as those in ordinary surgical cases, and inasmuch as both streptococci and staphylococci are concerned in these cases, because they are in fact generally mixed or double infections, so the lesions display the characteristic disturbances of the well known parasitic inroads. Whether these be in the nature of phlegmasia alba dolens, an abscess during the establishment of lactation, a post-*puerperal* peritonitis, or the development of abscesses in various parts of the body, the active part played by these organisms is always the same and about the only perplexing problem in the matter is the reason why infection takes place slowly in some cases and rapidly in others, or why the programme is so diversified.

I remember, for instance, the case of a young primipara whom I had to see a number of times in consultation, who developed abscesses in various parts of the body, in the bones as well as about some of the joints, the neighborhood of certain epiphyses being especially frequently attacked, who nevertheless lived for several months, and finally succumbed to the exhaustion consequent upon the duration of her trouble. In the pus from one of these abscesses, I discovered both forms above alluded to, and as I think over the case now only wonder that she could have lived so long. She developed also an endocarditis of considerable severity, and this helped to terminate her life. Of course, in such a case there was no difficulty in accounting for the presence of pyogenic organisms at the time of her delivery and the primary path of infection in such cases is too well known to call for remark here. Cases so chronic as hers, however, are infrequent, and perhaps justify the prominence given to them here.

#### *OTHER GENITO-URINARY LESIONS.*

#### OTHER GENITO-URINARY LESIONS.

That recent gonorrhœa is by no means the only disease of the genito-urinary system by which mixed or secondary infection can be brought about will be plain upon a little further consideration. It is well known that abscesses in the kidneys are frequently met with which cannot be accounted for by trouble extending upward from below. While it may be hard to explain many of these cases, certainly many of them find explanation in the physiological fact that the kidneys are excretory organs, whose function is sometimes called into play for the purpose of eliminating certain pathological organisms which have gained access to the circulation. Certain other of these abscesses are due to tubercular disease in these organs, and some of these consequently are mixed while others are secondary infections.

It is also well known that normal urine when extravasated or injected is capable of resorption without provoking serious disturbance. On the other hand when overloaded with the various morbid and toxic products pertaining to many diseased conditions, it is positively toxic and if it contain, from any source, pathogenic organisms, it may, if it escape from its accustomed conduits or reservoirs, produce intense local or fatal general disturbance. Pyo-nephrosis, for instance, is by no means always a primary disturbance since it is often an evidence of secondary infection, which it may reproduce, or even cause a tertiary infection. Moreover, the results of abnormal escape of unhealthy urine, as from a ruptured bladder or urethra, are not only well known but must be regarded in the light of secondary or mixed infections. That the tissues badly bear the brunt of such infection is largely due to the intensity or virulence of the local infection. When time offers abscesses will often be met with in the joints or elsewhere about the body.

## INDEX OF SURGICAL PROGRESS.

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### GENITO-URINARY ORGANS.

**I. The Influence of Cystoscopy upon the Diagnosis and Treatment of Urinary Diseases.** By E. HURRY FENWICK, F.R.C.S. (London). The author reports conclusions based upon the systematic cystoscopic examination of large numbers of healthy bladders, of 100 patients suffering from profuse hæmaturia; of 30 cases of tuberculous or scrofulous ulceration of the bladder; of 32 cases of vesical tumor, besides many other cases of obscure reno-vesical diseases, such as pyelitic inflammations, encysted calculi, sacculated bladders, pseudo-prostatic obstructions, etc. These examinations were in some patients controlled by digital exploration or operation, and in 7 instances (in the section of vesical carcinoma) by post-mortem investigation.

Before any conclusions were submitted for criticism it was considered essential to bring forward evidence that accuracy in diagnosis, and often also in the prognosis of obscure bladder disease, could be obtained by means of the cystoscope in an early stage of the disorder. To this end all the necropsies which had been secured in the series were cited, and the specimens demonstrated. The specimens belonged to the section of vesical cancer, and each was accompanied by the diagnosis and prognosis which had been made cystoscopically, and which had been written or printed months before the demise of the patient. These few post-mortem criticisms of cystoscopic diagnoses and prognoses proved that electric cystoscopy was an accurate and important factor in the scientific treatment of obscure bladder disease.

Some of the conclusions were as follows:

*Surgical Renal Disease.*—The dangers of performing nephrectomy without investigation of the presence of and working capacity of the

#### GENITO-URINARY ORGANS.

companion gland are recognized, but the difficulties of obtaining any correct estimate of the renal power which will remain after ablation of the diseased organ are avowedly great. Cystoscopy of the urethral orifices removes much of the difficulty. The efflux establishes at once the presence of a working kidney. The sluggishness or rapidity with which the jets succeed each other marks the absence or presence of irritation in the pelvis, a slow or active secretion. The color of the jet, whether it be clear, muddy, or bloody, testifies to the normal or abnormal condition of the secretion. The urethral orifice, moreover, becomes implicated by descending changes from the pelvis of the kidney. The shape and appearance, therefore, of its orifice are not infrequently an index to the change in the corresponding pelvis and ureter. More especially is this the case in scrofulosis. As yet the catheterism of the male ureter under electric light is too difficult to be practical.

*Bladder Conformation.*—A natural ledge formed by the interureteral bar—the base line of the trigone—is often strikingly developed even in healthy bladders. The weakest part of the bladder is apparently immediately behind this line, for in those who have had to overcome even a slight obstruction in urination there is more or less of a gutter-shaped depression of the entire wall apparent in this position. Behind this ledge and in this gutter may be seen the smaller stones. Fasciculation and dimpling are not uncommon in healthy bladders. Figure-of-8 shaped or cottage-loaf shaped bladders are rare, but are sometimes met with: these brace the stone on to the pubes.

*Calculi.*—Stones in the bladder may be sometimes missed on sounding from a variety of causes which are demonstrable by the cystoscope. A small stone can be completely or partially engulfed by the approximated swollen folds of chronically inflamed mucous membrane. These folds can be seen in bladders which contain at the time of examination 4 ounces; when the bladder is distended to 8 ounces or 10 ounces the stones drop on to the base. Medium sized stones (1 to 2 drachms in weight) are often lodged behind the interureteral bar, and may be seen partially sunk in heaped up swollen mucous membrane. Some stones are seen completely covered with flocculent mucus or with blood clot. All such may be overlooked in sounding on account



of the circum- or superjacent soft material. Stones in pouches (sacculated stones) are rare. They are missed for three reasons: (1) the orifice of the sac is narrowed in incomplete distension; (2) superadded to this the orifice is further narrowed because the mucous membrane lining the mouth is often greatly swollen and gelatinous with inflammation. These sacs are usually near the ureteral orifices. It is therefore recommended that bladders be well distended, after the chronic swelling has been reduced, before being sounded.

*Ulceration.*—It is perhaps hardly realized by the profession that a very large proportion of cases of obscure pains in the perineum and penis, accompanied by hæmaturia, are ulcerations of the posterior wall of the bladder. Such ulceration may last for years without extending. Not infrequently they are covered with lime phosphate. It is more than probable these were the cases encountered by Sir Henry Thompson, and reported by him as "digital exploration. Nothing found except a scale of phosphatic matter adherent to the bladder." Such cases are greatly benefitted by lactic acid injections, 1% to 4%, given daily, or by scraping. It might be supposed that pellucid urine would exclude the presence of ulcerations of the bladder. This is not always so. The author has seen deep ulcers with perfectly clear urine. There is a near connection between these ulcerations and tuberculosis. Such ulcerations are easier seen than felt.

*Tuberculosis*—The straining, frequency, and pain observed in tubercular renal affections are not always due, as is taught, to reflex conditions. In many cases such symptoms are explained by great swelling of the mucous membrane around the orifice of the bladder impeding the outflow of the urine. This may be caused by the direct irritation of the urine or by the implication of the subjacent prostate. The bladder appears to be most often the origin of urinary tuberculosis.

*Tumors.*—Carcinomata are the most common. Villous papillomata are rarer. Pedunculation is not a criterion of the nature of the tumor. Although only 3% of museum carcinomata are pedicled, yet in the early stages of the softer forms of bladder cancerous tumors, pedunculations, or subsessility is not uncommon. It is, perhaps, relatively

commoner in female bladders. This being so, the earlier the examination and operation are undertaken the greater the chance of the successful removal of pedicled carcinomata. Very many carcinomata have shreddy necrotic surfaces, which may be mistaken for villous growths. The onset symptom is, in a large majority of cases, a hæmaturia. This has no relation to benignancy or malignancy as is taught, but depends upon the delicate texture of the growth. The appearance of the blood does not mark the birth of a growth, but is due to some traumatism of a pre-existing tumor or some degenerative surface change.

The frequency of micturition and pain in vesical neoplasms depends usually, in the earlier stages, on part of the growth floating into the urethral orifice and plugging the outlet; thus atony and residual urine are not uncommon in all forms of vesical growth. The oscillations in the severity of the symptoms of a patient suffering from vesical growth are due (as in ulceration and stone) to transient flushes of localized cystitis.

A prognosis depends mainly upon the amount of implication of the wall of the bladder, also upon the position of the primary growth, whether it be on the posterior wall or near one of the three orifices of the bladder. In the latter positions the disease kills quickly; those situated on the posterior wall take about two years for completion. The most common situation for primary growths is in the neighborhood of the urethral orifices. Much needless operative interference can be prevented by the cystoscopy of bladder tumors, and the best method for attacking the growth (the choice of the suprapubic or perineal routes) is settled by such an examination.—*British Medical Journal*, October 18, 1890.

**II. On a Case of Nephrolithotomy (Following Nephrectomy) for Total Suppression of Urine Lasting Five Days; Complete Recovery and Good Health Five Years after the Operation.** By R. CLEMENT LUCAS, F.R.C.S. (London). This case was mentioned by the editors of the medical journals at the date of the operation, in 1885, as a case of exceptional interest, but the de-

tails of the case have never been before published, nor has the patient, or the kidney, or the stone which caused suppression, ever been exhibited before. The author had delayed publishing it because those to whom he mentioned it, whilst applauding the attempt to save a life on the extreme verge of dissolution, threw the coldest doubt upon the patient's future, maintaining that even if she recovered from the immediate effects her life must be a short and painful one; that the one remaining kidney, having been opened and drained, would rapidly degenerate, or another stone would quickly form and bring about a final catastrophe. After the lapse of five years the author thought he might be acquitted of any attempt to claim an incomplete success. The patient is still living and enjoying the best of health, and a freedom from pain discomfort, and hæmaturia, which, for seventeen years before her right kidney was removed, were almost constantly present. The operation for total suppression of urine was one that the author had long considered justifiable, and he had on more than one occasion previously publicly advocated its performance.

The patient had been under the care of Mr. F. D. Atkins, of Sutton, Surry, to whom much credit is due, both for the original diagnosis and for the promptitude with which he acted when total suppression occurred.

F. F—, æt. 37, was first admitted into Guy's Hospital on June 22, 1885. There was a strong family history of consumption. For seventeen years she had suffered from hæmaturia at intervals, and for nine or ten years this had been accompanied with pain on the right side of the abdomen, and for seven years a tumor diagnosed as a floating kidney had been felt on this side. On July 14 the right kidney was removed by lumbar incision. It was a mere shell containing masses of stone, and weighing 21 ounces. The wound healed completely, and she left the hospital convalescent on August 10, just within a month of the operation. All went well for three months. She had returned to her household duties, was free from pain and hæmaturia, and much satisfied with the result of the operation.

On Sunday morning, October 24, 1885, she was suddenly seized, between 7 and 8 o'clock, with most violent and agonizing pain in her

#### GENITO-URINARY ORGANS.

back and left loin. The pain passed through the loin to the front of the abdomen and groin. About 8 o'clock she passed a little urine, but from that time all secretion stopped. Vomiting commenced about half-past eight on the same morning, and was continued at intervals and whenever anything was taken. Mr. Atkins was called to see her, and found the bladder empty. Vomiting and anuria continued throughout Sunday, Monday and Tuesday.

On Tuesday Mr. Lucas met Mr. Atkins in consultation, and advised operation.

The symptoms continued without cessation on Wednesday, when she was brought to London, but Mr. Lucas's medical colleagues still advised him to postpone operation till a further trial had been given to diuretics, and in deference to their opinion he waited another day. On the afternoon of Thursday, the fifth day of anuria, the patient became drowsy and weaker, so that it was difficult to rouse her to obtain answers to questions. Her pulse was weak, her temperature  $99^{\circ}$ , and she had become less sensitive to pain and indifferent to what was passing around. Ether was given, and Mr. Lucas cut down on her remaining kidney and discovered a conical stone acting as a ball-valve to the top of the ureter. The stone was rather more than three-quarters of an inch in length, and from three-eighths to five-eighths in diameter. Urine began to drop away out of the wound as soon as the pelvis of the kidney was opened, but the pelvis was not found much dilated.

The patient recovered well from the anæsthetic, and was sick once only after the operation. For twelve days all urine was passed by the wound in the loin. Then an ounce and a half was passed with great pain from the bladder, and the quantity gradually increased.

After the nineteenth day all the urine was passed naturally. The wound ran an aseptic course, and the patient's temperature scarcely rose above normal. Healing was complete ten weeks after the operation. During the last five years she has been employed in household duties, and has enjoyed good health.

The patient was exhibited, together with her right kidney, which was excised, and the stone removed from the left kidney for total suppres-

sion of urine.—*Proceedings of the Royal Med. and Chirg. Society, 1890. Author's Abstract.*

**III. Double Nephrolithotomy for Renal Calculi Complicated by Pyo-Nephrosis.** By MR. TURNER (London). A woman presented two large renal swellings, anuria, vomiting and great prostration, and a well marked history of renal calculus. He first cut into the right kidney from which he removed a mass of calculi with malodorous pus, weighing an ounce; the other side presented the same condition. The patient recovered very well from the immediate effects of the operation, but died thirteen days later from asthenia. The author believed this to be the only case on record of double nephrolithotomy at one sitting.

In the post-mortem records of St. George's Hospital for 21 years past he found 43 cases of renal calculus, in 19 of which multiple stones were present. In but 9 cases were both sides affected, two of which had been subjected to operation for calculous suppression of urine. Of the one-sided cases the stone was on the right side in 17, and on the left in 15. Pyonephrosis was present in 12 cases. The ureter was completely blocked in 9 cases, in 8 of which the obstruction was at the renal end. The stone was 5 inches long in one case. In the one-sided cases, the unaffected kidney was free from degenerative action in but 8 instances.—*London Lancet, Jan. 17, 1891.*

**IV. Nephrolithotomy on Both Kidneys with an Interval of Two Years with Death Due to Hæmorrhage From the Renal Wound.** By R. J. GODLEE, F.R.C.S. (London). A man, æt. 37, two years after the development of renal symptoms, was subjected to nephrolithotomy for calculus and pyelitis of the left kidney, mischief being also suspected in the right. A large quantity of uric acid and phosphatic stone was removed, and the patient made a rapid recovery, but the closure of the wound was not permanent, and after several febrile attacks, it was found best for the patient to wear a plug permanently in the fistula to prevent periodical accumulations of pus and urine in the kidney. At one time, the ureter was completely blocked and an operation was undertaken to remove a stone which

was supposed to be obstructing it; none was found, but the ureter became again patent after the operation, and the state of the kidney very much improved. The symptoms pointing very strongly to calculus in the other kidney, it was exposed a year later, and large masses of uric acid stone removed. No bleeding followed the first incision into the kidney, but the laceration caused by extracting the calculi produced very free venous hæmorrhage, which was readily controlled by pressure. At the completion of the operation there was little or no bleeding, but it was thought safer to plug the kidney; the patient remained in fair condition for an hour and a half, and then suddenly died as the result of fresh hæmorrhage from the kidney.

Mr. Mayo Robson (Leeds) had performed nephrolithotomy in a case where a small incision into the renal substance was followed by violent hæmorrhage, which he was unable to restrain by ordinary means, and he was finally compelled to excise the entire kidney in order to save the patient's life; the source of the hæmorrhage was a wound of an abnormal vein in the capsule. In another case where violent hæmorrhage had followed nephrolithotomy, the bleeding appeared to cease, but it became necessary to excise the kidney, but with a fatal result.

Mr. Arbuthnot Lane (London), in a case of severe hæmorrhage, had been able to control the bleeding by sutures passed through the kidney substance.—*London Lancet*, Jan. 17, 1891.

**V. Nephrolithotomy.** By E. GIFFORD NASH (Plymouth). The following four cases were subjected to operation at the South Down and East Cornwall Hospital, the first by Mr. Swain and the last three by Mr. Whipple.

1. A man, æt. 24, presented a history of an attack of pain in the left loin three years previously, radiating into the groin and lower abdomen and causing nausea; these pains, recurring about once a week, have been at times followed by hæmaturia and have been aggravated by jolting movements. Deep pressure in the left loin revealed tenderness but no renal enlargement, while urinary examination showed a trace of albumen, a few blood discs and no crystals. An incision 3 inches long between the last rib and the crest of the left ilium, discov-



ered the kidney high up, in which was found a small oxalate of lime calculus, about the size of a pea; this was fixed between the fingers and extracted through an incision in the renal cortex. Free hæmorrhage occurred from the incision, controlled at first by tamponing and later by iced boracic lotion. A drainage-tube was inserted, and a wood-wool dressing applied. The patient passed on to recovery in about two months.

2. A man, æt. 45, during the preceding 20 years, had suffered at intervals of two or three weeks from paroxysms of pain in the right loin, extending also to the groin and testicle of the same side. Five years from the first attack, and until about a year ago, he began to pass gravel at intervals. Five weeks ago, the symptoms all began to increase to an intolerable degree. The abdominal walls were thick and owing to their adiposity, the kidney could not be mapped out. The urine contains albumen, a few blood and more pus cells, oxalate of lime crystals and a few granular casts. The right ileo-costal space was incised parallel to and about an inch and a half below the last rib. Manipulation of the kidney was negative, but punctured with a hare-lip pin located a stone at once. Incision of the cortical tissue made it possible to turn out with a lithotomy scoop and the finger a feathered oval oxalate of lime stone, weighing 275 grains. Free hæmorrhage was controlled by sponge tampons, which were removed on the following day, and drainage and dressings applied, the patient making an excellent recovery, and being discharged on the eighty eighth day.

3. A man, æt. 32, had received a spear wound in the right loin five years previously and had afterward been treated for an abscess at that point. Pain still continued in this region, being of a throbbing character, and not radiating to the testicle. The urine was slightly acid and contained pus cells and oxalate of lime crystals. After admission to hospital his temperature maintained a constant elevation. Through an incision parallel to the right last rib, the kidney was exposed and opened, discovering pus and several calculous masses, the total weight of which was 124 grains. The patient did not rally well and complained of urinary retention which catheterization failed to relieve on account of a urethral stricture. Death occurred the same evening,

and the autopsy showed the existence of a large perinephric abscess about the right kidney and extending to the liver, about half of the right and a third of the left lobe of which had been destroyed by it.

4. A woman, æt 36, had, during the two previous years, suffered from periodic attacks of lumbar pain, radiating at times toward the groin, which had latterly become constant. She had had several attacks of renal colic, accompanied by vomiting, but had noticed nothing like gravel. Micturition had been painful; the urine was acid and contained a little albumen, and excess of phosphates, pus and blood cells and oxalate of lime crystals. Exploration showing that there was nothing in the bladder, the right kidney was exposed by an incision parallel to the last rib and punctured with a hair lip pin in four places without perceiving a stone; but exploration of the pelvis with a finger through an incision in the cortex revealed a small oxalate of lime calculus, weighing 29 grains, which was readily removed. Air having been heard entering through the wound, the pleura was thought to have been perforated. The patient made an excellent recovery under a dressing of boracic lint and wood wool in about six weeks.—*London Lancet*, Dec 13 and 20, 1890.

**VI. The Importance of the Post-Prostatic or Trigonal Pouch in the Surgery of Vesical Calculus.** By G. BUCKSTON BROWNE (London). Errors in sounding for stone, remarks the author, have perhaps attracted more attention than mistakes in the diagnosis of any other surgical malady, and the best way of removing a stone from the bladder is even still a frequent matter for argument and difference of opinion. The chief cause of this uncertainty is the fact that the bladder is not always a simple sac, but sometimes has pouches, pockets or sacculi opening out of its general cavity, in which stones may lie and escape the diagnostician's sound, or the lithotrite, tube or forceps of the operator. All this is simple enough, and known to every surgeon, but the fact that vesical sacculi are of very different kinds is not universally known or appreciated, and great error is caused by speaking loosely of pouched or sacculated bladders, as if all the pouches of a bladder were alike. Bladder pouches may be divided into three varieties.

*a.* The well recognized sacculus, which may be called the ordinary sacculus, consisting of a protrusion of mucous membrane between the muscular fibres of the bladder; they are found in the upper part, at the sides and in the floor of the bladder, and where it is covered with peritoneum, they are covered by the same membrane.

*b.* The post-trigonal pouch, a pouch often formed behind the trigone; *i. e.*, behind a line drawn between the vesical orifices of the ureters, is a part of the general cavity of the bladder, but is sometimes deep enough to make difficult the discovery of a stone lying within.

*c.* A post-prostatic or trigonal pouch, which has hitherto received little notice, although it is the chief cause of error in searching for stone and of imperfection in its removal, whether by the lithotrite or the knife. It is often of extraordinary depth. If it be considered with the patient recumbent, it may be said to consist of the trigone of the bladder, pushed down between the enlarged and projecting prostate in front and a thickened and firm inter ureteral ridge behind. Where there is much intra-vesical prostatic projection, the pouch may literally be roofed over by this prostatic outgrowth. Calculi here cause much pain, since the trigone has a larger nerve supply than any other part of the bladder. Lying in front of and below the orifice of the ureters, the pouch is a perfectly contrived trap for catching and retaining renal calculi upon their entrance into the bladder, and a most favorable site for their growth.

Seven cases were reported in great detail in which these pouches prevented a cure by lithotrity, or where they so concealed stones as to prevent their discovery when sounding in the usual way. The conclusions to be drawn from their consideration are:

1. To insist, in all doubtful cases of vesical suffering, where the prostate is enlarged, upon careful search behind that organ. In sounding in such cases, it is not enough merely to reverse the beak of the sound, but thorough examination must be made with the reversed beak for the slit-like opening between the intra vesical prostatic growth and the intra-ureteral ridge, which may be the sole means of access to a larger post-prostatic pouch, where such a pouch exists. For this

investigation a broad, flat bladed lithotrite, designed by the author, will be found useful. The broad flat beak is easily reversed when in the bladder, and it slips with greater facility than the beak of an ordinary round-ended sound under the projecting lobe of the prostate, allowing the space under it to be as fully explored as possible by any instrument introduced by the natural passages. Help may sometimes be afforded in this exploration by inserting a rectal bag into the bowel before sounding, or by an assistant making upward pressure with his finger in the rectum. The endoscope, as in too many of the really obscure troubles of the bladder, is here of no use; nor, is distension of the bladder with fluid, which in case of a post-trigonal pouch, is always useful, of any avail where the stone lies in a post-prostatic pouch.

2. When there is reason to believe that there is a deep post prostatic pouch, it will be well, save in very exceptional cases, not to attempt lithotripsy, for under such conditions it is likely to be impossible to clear the pouch of all vesical debris by instruments passed in through the urethra.

3. When calculous symptoms and vesical distress continue in spite of treatment, and no stone can be found by the usual methods of examination through the urethra, and also in cases where a stone is found, but lying deeply in a post-prostatic pouch, it is urged that the bladder should be opened by supra-pubic incision in preference to all others, for combined with firm upward rectal pressure, the surgeon thus obtains command over the post-prostatic pouch such as can be obtained by no other cystotomy, while at the same time it is incomparably safer than any perineal operation, being almost bloodless in cases which by their very nature—great prostatic enlargement—are certain to bleed freely if any incision is made between the legs.

**VII. Suprapubic Cystotomy and Excision of Vesical Papilloma.** By MR. CRAVEN (Hull). A man, *æt.* 64, had suffered for four years from hæmaturia, with pain in the loins. The urine contained blood but no casts and the sound discovered no stone. Other organs were healthy. Neoplasm of the bladder being suspected, an

exploratory cystotomy was made and the finger in the bladder discovered a small growth on the left side of the fundus, near the opening of the left ureter, and possibly surrounding it, consisting of several nodules with a broad base of attachment. It was removed with the scissors, the wound partly closed and the bladder drained. Convalescence followed in about three months. The growth had the appearance of a simple adenoma.—*London Lancet*, Feb. 7, 1891.

**VIII. Suprapubic Lithotomy in China.** By SURGEON-MAJOR B. STEWART (Amoy). The author reports four cases:

1. A man, æt. 30, presented symptoms of a stone of large size, which could be plainly felt by manipulation between the abdominal wall and the rectum. Under chloroform, between eight and ten ounces of warm solution of boracic acid were injected into the bladder and the penis ligatured with a piece of india rubber tubing to retain the liquid. The bladder was thus distended above the pubes. An incision was extended upward from the symphysis four inches and the fascia and muscular fibres of the pyramidalis and the linea were carefully cut through to the full extent of the wound, then with fingers and handle of the scalpel, the glistening surface of the bladder was gradually exposed, the thin layer of peritoneum with the fat being scraped upward toward the top of the incision and held there by an assistant. The bladder, steadied by hooks, was now punctured near the upper portion of the skin wound with a sharp pointed bistoury, which was carried downward in a straight line toward the pubis. The opening being then found to be too small for the passage of the stone, it was enlarged upward and the calculus removed, measuring  $2\frac{1}{2}$  by  $2\frac{3}{16}$  by  $1\frac{5}{8}$  inches in size and weighing 5 ounces and 40 grains. The bladder having been washed out with a weak solution of boracic acid, the wound was allowed to remain open and a soft rubber catheter placed in the bladder with the end hanging out at the pubic end of the wound, which was covered with a carbolized oil dressing changed twice a day. The patient recovered slowly because of the formation of a bedsore, but the catheter was removed from the wound and some urine passed by the urethra on the twelfth day and the bladder wound was treated on the thirtieth

Some months later the patient was found to have developed a ventral hernia at the upper part of the abdominal cicatrix.

2. A boy, æt. 7, had the bladder distended with a few ounces of boracic acid solution and the penis ligatured. An incision  $2\frac{1}{2}$  inches long was made and the bladder reached as in the preceding case. The bladder was opened with a scalpel and forcibly enlarged with the fingers, giving passage to a rough stone,  $1\frac{1}{2}$  by  $1\frac{1}{8}$  by  $\frac{11}{16}$  inch in size and 230 grains in weight, chiefly of uric acid. The wound was closed on the thirty eighth day and the cure complete three weeks later.

3. A youth, æt. 17, had removed in the same way as in the preceding cases a uric acid stone  $1\frac{3}{8}$  by  $1\frac{1}{8}$  by  $\frac{11}{16}$  inch in size, and 242 grains in weight. The bladder was drained by means of a catheter tied in the urethra; it was removed, however on the third day on account of suspected irritation. The water was then allowed to drain from the wound, which was kept constantly smeared with boracic acid ointment to prevent excoriation. Ten days later a little urine passed by the urethra and the quantity increased daily until the twenty-ninth day when it all passed by the natural channel, the wound being completely healed on the thirty-eighth day.

4. A boy, æt. 6, had removed a uric acid stone  $1\frac{3}{16}$  by  $\frac{3}{4}$  by  $\frac{6}{16}$  inch in size, weighing 77 grains. The straining of the patient in the effort to vomit forced out the peritoneum at the upper angle of the wound looking like a delicate thin bladder. The bladder, steadied by a loop of catgut, passed through the upper wall at its upper part, was opened and the stone readily extracted. The bladder was closed by sutures about  $\frac{1}{4}$  inch apart through the muscular coat only and although a drainage tube remained in the wound urine passed freely by the urethra the next morning; there was nevertheless variable amount of leakage from the wound, which healed finally and completely in forty days.

In none of these cases was any attempt made to distend the rectum, yet in no case was there any great difficulty in reaching the bladder and the author believes that if care be taken, after dividing the skin, muscular fibres and fascia, to use the fingers and scalpel-handle in removing the cellular tissue and fat covering the vesical surface, there



is but little danger of wounding the peritoneum.—*Lancet*, December 13, 1890.

JAMES E. PITCHER (U. S. Army).

#### LYMPHATIC SYSTEM.

**I. Case of Rupture of Thoracic Duct. Death by Inanition at end of thirty-eight days.** By ALVIN EYER, M.D. (Cleveland). Male, æt. 28; thorax was squeezed between a railroad car and an engine; no fracture of ribs; but marks of external contusion resulted; traumatic pneumonia affecting right lung followed at once; during second day some gaseous distension of abdomen and hyperresonance of thorax, subsiding in great measure within thirty-six hours; on the seventeenth day a fluctuating swelling was detected in right inguinal region, which, on being opened, gave exit to much offensive gas and tœcal like liquid discharge. After two or three days this discharge lost its offensiveness and became opaque and milky in character; rapid emaciation set in, the loss of body weight being estimated at above four pounds per day, and at the end of twenty-two days more, being the 38th from the occurrence of the injury he died from inanition despite persistent and intelligent efforts at both stomachic and rectal alimentation. On autopsy all the abdominal organs were found healthy; the right lung presented the appearance of pneumonia usual to that period of the disease; behind the right pleura was a cavity extending from the apex of the thorax to the diaphragm which had been formed by dissecting up the pleura, and which was full of fluid similar to that which had escaped from the inguinal fistula during life; about the aortic opening in the diaphragm there were evidences of recent inflammation which involved to some extent the adjacent portion of the liver and the œsophagus. Further careful search revealed an opening in the thoracic duct at the point where it passes through the aortic opening in the diaphragm. The location of this opening sufficed to explain the two different currents of extravasation which had occurred.—*Med. Record*, Aug. 1, 1891.

## HEAD AND NECK.

**I. Absence of Pulsation in Perforating Fractures of the Skull.** By PROF. PAUL BRAUN (Konigsberg). The author calls attention to the fact that in certain fractures, particularly in children, one or more of the fragments may be driven beneath the neighboring intact bony vault. In these cases there will be lacking the visible pulsation of the brain, although palpation will reveal its presence. The absence of pulsation is explained by the extreme tension to which the dura mater is subjected in order to accommodate the increased thickness of bony mass due to the displaced fragment. It is suggested that a similar condition would be present in subdural hæmorrhages or cerebral abscess. The fact is likewise mentioned that this symptom may be present in deep chloroform narcosis, without depression or displacement.

A case is reported by the author in illustration of the points set forth.—*Centbl. f. Chirg.*, 1890, No. 46

G. R. FOWLER (Brooklyn).

**II. Congenital Occipital Meningocele treated by Ablation of the Sac; Recovery.** By PROF. ANGELO MAZZUCHELLI (Pavia, Italy). The writer presented a young child to the Medico-Chirurgical Society of Pavia, which he had operated on for a small congenital tumor situated in the occipital region, which from its seat and symptomatology was diagnosticated as an occipital meningocele. The skin was incised over the tumor and two flaps formed. A ligature was applied to the pedicle and the tumor removed above the ligature; the skin flaps were then brought together and sutured. Union took place by first intention and recovery followed.—*Gaz. degl. Osp.* 1890, No. 89.

**III. Resection of the Condyles for Ankylosis of the Lower Jaw.** By DR. PALMIRO JEMOLI (Pavia). The writer describes the following case operated on by Prof. Bottini for complete ankylosis of the lower jaw, according to a method devised and successfully employed by him in 1872. G. S., a tailoress, born of healthy parents, passed through an eventful infancy and childhood, suffering at eight

months from the whooping cough, at two from the measles and at eight from the scarlet fever. These diseases together with the insufficient nutrition which she received left her weak and slightly built. Although *æt.* 17, she had never menstruated. Her parents had already remarked at her 9th month, after the attack of pertussis, that she could only open her mouth to a slight degree; no physician was, however, then consulted, as it gave but little trouble. As soon as the child had arrived at dentition the teeth began to appear and the deformity became more striking. Several attempts were made to open the mouth by forcible dilation but with no success. On examination a complete ankylosis, with hypertrophy and sclerosis of the muscles, was discovered. The patient was prepared for operation, etherized and a straight incision four centimetres long was made one and a half centimetres in front of the auditory canal. The condyle was laid bare and found to have entirely grown to the glenoid cavity, there being no trace left of an articular cartilage. Instead of a chain-saw or bone forceps, the operator made use of a small scalpel, held like a chisel, with which and a wooden mallet he detached the condyle from the temporal bone and resected it. The wound was packed with sulpho-carbolate of zinc gauze and the operation repeated on the other side. The wound was dressed and drained. The patient's mouth was opened by a dilator and the muscles stretched; passive movements were made and the muscles exercised under chloroform anæsthesia until they had attained quite a degree of strength. One month after the operation the patient could open her mouth about four centimetres, eat the food of the hospital patients, consisting of meat, bread and soup; her speech had become perfectly normal. In place of the ankylosis pseudo-arthritis had formed, which the operator hoped would be permanent, as the patient, seen over two months after the operation, could easily and painlessly chew any solid food; the movements of the jaw were also becoming freer.—*Gaz. degl. Osp.*, No. 11, 1891.

F. H. PRITCHARD (Boston)

STUDIES UPON INJURIES OF THE KIDNEY,  
NEPHROLITHOTOMY AND NEPHRORRAPHY.

By AUG. SCHACHNER, M.D.,

OF LOUISVILLE.

**I**N THE preface of this paper the author wishes to state that the succeeding lines are intended as an additional contribution, rather than a complete study upon the momentous subjects indicated in its title.

At the outset I wish to acknowledge my obligations to Dr. B. H. Lammers, Dr. Eiseman (D. V. S.), Mr. Joseph Coomes, and others, for their invaluable assistance which has been freely given me in my work.

In this contribution it has been my endeavor to add to our knowledge concerning these affections with the hope of increasing the chances of saving this organ in conditions which formerly might have demanded its removal.

The import of this necessity is most keenly felt, when we remember their significance as the most important emunctories in the human economy.

While life itself may continue apparently unaffected after the loss of a kidney, it nevertheless seems within the pale of logic to regard such a loss as proportionally increasing the chances of future difficulty from over-taxation, not to speak of the gravity which would attend the presence of a condition demanding surgical interference upon the remaining organ.

It is frequently a difficult matter to draw a hard line between the relative bearing which the physician and the surgeon have toward many of the pathological processes of this organ, to decide when and which are medical or surgical cases.

The text of this article is based upon an analysis of the present literature upon the subject, together with a few observations drawn from the post-mortem table and a moderate amount of experimental investigation.

It was my intention to have dwelt upon nephrolithotomy and nephrorrhaphy as thoroughly as upon the injuries of the kidney but time and space defeated this end.

This is all the more to be regretted since certain sections, especially upon nephrolithotomy, are perhaps of the greatest moment to the surgeon.

The original intent was not only altered in this respect, but it became necessary for the same reason to at least temporarily abandon a series of experiments embodying some possible improvements upon a subject closely related to the one under consideration.

In carrying out these experimental operations due regard was attached to cleanliness. The operative field was thoroughly scrubbed with soap and warm water and finally irrigated with a sublimate (1x1500) or a carbolized solution.

Throughout the operation the neighboring space was carefully protected with towels wrung from a warm sublimate solution.

Where irrigation was resorted to within the cavity, either warm Thiersch's solution or boiled water was employed. The animals were selected irrespective of their size or condition and submitted to no preliminary preparation other than anæsthetization.

For the latter purpose both ether and chloroform were employed. The former was invariably employed to commence the anæsthesia, which was afterward continued with chloroform cautiously administered.

The animals were fed upon finely chopped meat or upon milk. However slight the operation may have been, they ate little or nothing, as a rule, upon the following day.

Unless otherwise indicated, the kidneys were exposed through an incision made into the loin commencing immediately below the ribs, running parallel with and a short distance from the spine. While such an incision afforded an admirable access to the kidney, it was nevertheless far from being as

desirable as one in the linea alba, since the peculiar position of the subject, at best afforded a miserable provision for drainage, and was in a few instances the cause of infecting the interior.

The incisions were closed by a double row of sutures, inverting the flaps at the lower angle as a provisional step toward securing drainage. The union in all but two instances was by slow granulation.

In the excepted cases primary union was obtained. As for suture material, silk, prepared after the precepts of Czerny, was generally employed for internal work. For closing the entrance wound linen thread (Marshal's) properly disinfected was exclusively used. In addition to the silk, catgut of different sizes and variously prepared was also experimented with. The ordinary catgut, duly sterilized, was generally absorbed too rapidly in renal tissue to be considered a safe material unless an extra large size was selected.

Experiments were made with the view of retarding its absorption as well as endowing it with hæmostatic properties. In the beginning the gut was allowed to remain for several days, immersed in the ordinary tincture of Ferric chloride under the impression that the time of maceration would bear a direct ratio to the necessary time required for its absorption. If, however, the maceration was continued too long the gut became soft and useless. In lieu of this, immersion just before its employment was then attempted. When this was employed the gut in a few instances was dipped in alcohol just before its use, while in others it was used just from the iron solution. Besides the tincture, Monsel's solution pure and a mixture of equal parts of Monsel's solution and water were substituted. The endeavor to obtain a hæmostatic suture material was prompted by the hæmorrhage which was at times occasioned by the introduction of a stitch which perforated a small arteriole.

Although the immersion of the gut in the iron sensibly retarded its absorption without any evil effect upon the kidney itself, yet its hæmostatic property which it thus acquired seemed rather slight.

Whenever the sutures passed clear of a vessel there was practically no hæmorrhage.



If, however, they perforated an arteriole, especially if superficial, a rather troublesome oozing arose.

The ferrated gut in a number of instances arrested this oozing, but it also failed quite a number of times. Generally, such oozing was controlled by a few stitches introduced in such a manner as to constrict the structures around the opening.

The experiments are arranged according to their nature and variety rather than their chronological order of performance. An unsuccessful attempt was made to collect the urine with the view of establishing certain practical diagnostic points in the injury of these organs, but the unmanageable nature of the subjects rendered this impossible. The importance of conservative steps in certain selected cases of these injuries cannot be too strongly emphasized.

The value of a kidney that has been subjected to an operation for an injury and again recovered has been amply tested in these experiments by the removal of its uninjured fellow. In fact, the question as to the amount of renal parenchyma necessary to sustain life has already been the subject of considerable attention.

Tuffier,<sup>1</sup> who has conducted a series of experimental operations upon the commoner surgical procedures upon the kidney, has arrived at the following conclusions :

Almost complete cessation of the excretion of urine and urea followed every nephrectomy, lasting however never longer than twenty-four hours. The suppression of urine is supposed to be of a reflex nature.

This author is of the opinion that approximatively 1.0 to 1.5 grammes of secreting renal parenchyma is required per kilogram of the animal, and, reasoning from this concludes that for an average person of about 70 kilograms 80 to 100 grammes of renal structure are necessary, or one-third or one-fourth of the total amount. The death of the animals which were subjected to a series of nephrectomies occurred in from twenty-four to thirty-six hours but was not attributed to a uremia, but rather to a variety of profound collapse simulating a traumatic

<sup>1</sup>ANNALS OF SURGERY, October, 1890.

shock. The remaining part was credited according to the urine in the bladder, with continuing its function, compensation occurring partly from actual hypertrophy of the renal parenchyma and partly by the new formation of glomeruli.

While many of the questions touching upon this interesting subject may yet be impossible to decide, it seems that the resulting effect of a partial or complete nephrectomy is largely dependent upon the condition of the remaining structure. This was evidenced in Experiment 12, in which nephrectomy was practiced.

The remaining kidney, which presented unmistakable evidence of a parenchymatous degeneration, rapidly proved insufficient. While one-third or one-fourth of the secreting portion of the kidney may sustain life for a time being, yet such a diminished amount can hardly be expected to fulfill the natural demands for any length of time without breaking down from over-taxation to which it would necessarily be subjected.

The largest amount of secreting structure removed in these experiments was about one-third the total amount of a single kidney. The animal lived several months after the removal of the opposite kidney, during the whole of which it presented a broken down appearance, dependent in a measure apparently upon a toxæmia consequent to an insufficient renal action.

At times all appetite would be lost and the general appearance was that of a very drowsy condition.

At the post-mortem examination an abscess was discovered above the kidney, in connection with the supra-renal capsule together with a small abscess within the spleen.

There can hardly be a margin wide enough for the belief that death was entirely dependent upon the abscess external to the kidney.

The kidney frequently diminished considerably in size after being subjected to an operation even where this consisted of a simple exploratory incision.

The remaining secreting element of the kidney, however, usually underwent a compensatory hypertrophy.

Death is said to occur in from one to three days after the complete removal of both kidneys. In Experiment 13, this was carried out, the animal survived the removal of the second

kidney four days. During the whole of this time no outward symptoms were perceptible other than a drowsy condition.

In many of the experiments the efficacy of the recovered kidney was tested by the removal of the other organ. The only instance in which the recovered kidney seemed insufficient was in the twelfth experiment. In this the imperfect elimination of toxic refuse was very evident.

The presence of sepsis was recognized by an elevated temperature of from one to two and a half degrees, loss of appetite, diarrhoea, great thirst and a peculiar drowsy appearance.

In studying the effects of gunshot wounds a .22 ball was employed which with the kidney of a dog practically produced the same effect as that of a .32 or .38 in the human subject.

A microscopical examination of a kidney that had then subjected to a gunshot injury revealed a firm union, composed of cicatricial tissue which was surrounded by the renal structure bearing evidence of considerable contraction from the development of cicatricial tissue.

This compressed condition gradually merged into the healthy renal structure.

Where the compression was greatest the tubes were almost or even completely obliterated and the glomeruli very much contracted in size.

Parenchymatous degeneration of the cortex and a decided thickening of the capsule were distinctly evident.

#### INJURIES OF THE KIDNEYS.

*Classification.*—It seems that most authors in classifying the lesions to which the kidneys are liable, draw the line between those attended with a wound in the abdominal wall and those in which the latter is intact, considering under the first heading such injuries as contusions and lacerations, while for the latter is reserved the shot and stab injuries.

However, since the subparietal injuries are by far the most common, and when a wound in the wall does exist it is perhaps better to regard it rather as a complication, just as a renal injury may become a complication to another and more serious injury within the abdominal cavity, a simpler and possibly bet-

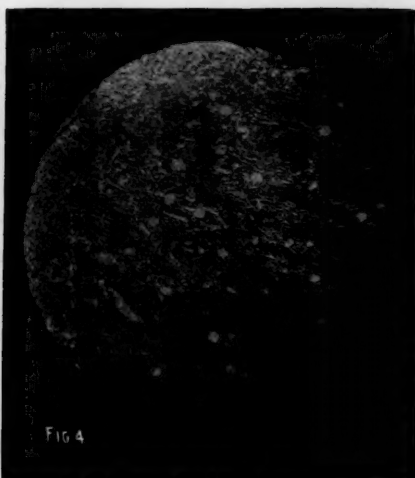
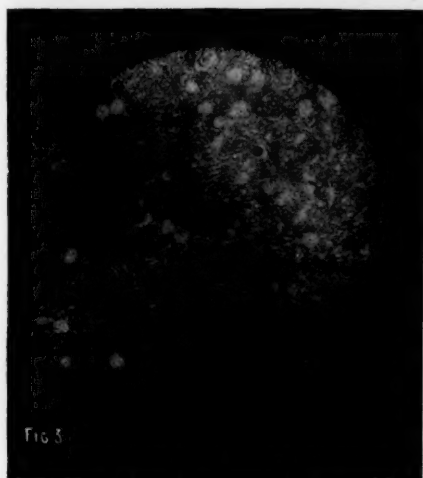
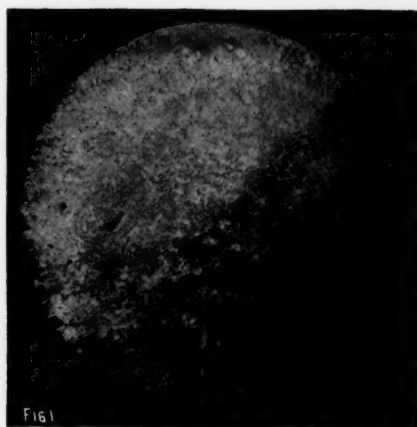


FIG. 1.—Microscopic section of a wounded kidney through cicatricial tissue.  
 FIG. 2.—Microscopic section of wounded kidney showing relation of true and cicatricial tissue.  
 FIG. 3.—Microscopic section of normal kidney of a dog.  
 FIG. 4.—Microscopic section of a kidney that had been subjected to an implantation.



ter arrangement would be into injuries of the kidney proper and injuries of its excretory duct, considering under the first heading contusions with or without rupture of the capsule and kidney structure, laceration, shot and stab injuries. Although the duct of the kidney may be injured in as many ways as the kidney itself, yet their size and more protected position makes their injury an infinitely rarer occurrence. As for the frequency with which the kidneys are injured and the abdominal wall left intact, Mr. Morris<sup>1</sup> remarks, that "out of two thousand six hundred and ten inspections of persons dying of all kinds of injuries and diseases there were thirteen of injured kidney, twelve of which were sub-parietal and one a penetrating wound."

*Causation.*—Apart from shot and stab injuries, a host of other influences contribute in determining the production of renal lesions. Among which we might repeat the well known buffer accidents, or the crushing of the trunk in a like manner between two opposing bodies, the passage of a wheel over the body in the lumbar region, direct blows upon the abdomen in the form of kicks, falling bodies, the explosion of shells, etc., falling from a height and striking against another object, the acute bending of the body and a variety of rarer accidents that occasionally likewise bring about these injuries.

*Pathology.*—Although the remote position of the kidneys frequently renders difficult the exact appreciation of traumatism. of these organs, it nevertheless fails in protecting them entirely from any variety of injury to which a more exposed member is liable. Those who have closely searched the kidneys upon the post-mortem table it will be needless to remind of the frequency with which palpable signs of former injuries are found, and those who have sharply studied the cases which the literature affords have, no doubt, been struck with the extreme degree of the lesions upon one hand, and oftener, by the disproportion between the cause and the effect and course of the lesion upon the other. To realize and appreciate this peculiarity, it is necessary to carefully remember their anatomical structure, their physiological function, and

<sup>1</sup>Diseases of the Kidney. Henry Morris, F.R.C.S.



the frequency with which these organs are found in a condition different from that of the healthy state. At best, its lacerable nature, its unremitting function as an emunctory and the oft congested and inflamed conditions must each lend their influence in determining the degree of the injury and shaping the character of its termination. Contusions and lacerations are the commonest varieties of injury to which these organs are liable. They may vary from the simplest lesion to an extensive laceration and destruction of the kidney. In fact, unless the contusion is singularly slight, it is generally associated with more or less rupture of the capsule or kidney structure.

The kidneys may also be lacerated to any degree. Otis mentions a case in which the kidney was lacerated through its entire long axis, death ensuing from hæmorrhage. Again, the kidney may be ruptured throughout in any direction, in which event death as a rule rapidly ensues from hæmorrhage. The rupture may be confined either to the anterior or posterior surface. In the former instance the extravasation of blood and urine occurs into the peritoneal cavity while in the latter extravasations of the same fluids are confined to the circumrenal tissues.

They may or may not be characterized with external evidences of an injury. This, however, offers no criterion as to the amount of the internal danger. Frequently, slight internal lesions are attended with extensive ecchymosis and evidences of considerable injury to the external surface, and on the other hand there may be little or no external sign to denote an extensive internal injury. Of this the two succeeding cases are fair examples:<sup>1</sup>

"A gentleman, whilst hunting, received a bruise over the left loin and on arriving home experienced a severe pain in the back. After a very judicious treatment of several weeks the bladder finally became irritable, the urine highly offensive and mixed with pus.

The pus increased, the health becoming deteriorated and death ensued after a lapse of about two years subsequent to

<sup>1</sup>Holmes' System of Surgery, Vol. 1, Page 8.

the accident. The left kidney was entirely destroyed, and in its structures was found a large irregular abscess with its walls adherent to the surrounding soft tissues and its cavity continuous with the ureter."

"A boy was struck over and rather in front of the right lumbar region by the handle of a truck. He immediately fell and though able to rise and walk a few steps he again fell, and was then carried to Guy's Hospital. He was in a state of extreme collapse with some pains in the abdomen. He died within an hour and a half of the accident. Externally, there was a slight ecchymosis over the extremities of the seventh and eighth ribs on the right side and the last two ribs on the left side. The cavity of the peritoneum contained a large quantity of coagulated and fluid blood. All that portion of the left kidney above the entrance of the vessels was torn from the lower portion and separated from the natural surrounding attachments. The lower portion was undisturbed. There was some ecchymosis on the surface of the liver opposite to that on the chest."

In addition to these another instance which came under the observation of the writer is mentioned further on, under the prognosis of these injuries. The wound in the abdominal wall may be of such an extent as to expose the kidney, or the exposed organ is occasionally found within the abdominal wound, or even lying completely outside of the body.

This, however, is most likely to happen where the abdominal wound is very large, and the kidney more or less movable. The hæmorrhage from renal injuries is variable, and when it occurs the clot may accommodate itself in several ways. In subcapsular lacerations, for instance, it is confined to within the limits of the kidney. Where, however, the laceration is somewhat extensive and anteriorly, the blood passes into the perirenal structures, and almost necessarily into the general peritoneal cavity. If the laceration is posteriorly the hæmatoma is found within the structures surrounding the kidney. The blood thus extravasated may become absorbed, or it may break down and suppurate, forming a nephritic or perinephritic abscess, or even give rise to a pyonephrosis. Mr. Morris, in his excellent work upon this subject, mentions a case in

which the blood remained unabsorbed—"A man who died eighteen months after the reception of a kick from a horse. Both kidneys were granular and full of cysts. The cellular tissue around the right kidney was consolidated, a large clot of blood occupying its pelvis and interior and communicated also with the exterior, where a large quantity of blood clot was lying in the subperitoneal tissue. The line of rupture could be faintly traced through the substance of the gland. The ureter was cut across about one and a half inches from the pelvis and was quite impervious."

It has also been pointed out by the same author that there may be an extensive effusion of blood into the cellular tissue around the kidney, with but little evidences of injury to the kidney itself, or, on the other hand, the kidney may "well nigh be converted to a pulp" directly from an injury, or secondarily, as the result of an injury with little or no extravasation into the surrounding structures.

Experimentally, it was observed that when the kidney was contused ecchymosis rapidly ensued, the kidney assumed a dark bluish appearance, increased in size directly in accordance with the amount of contusion, and if severe became fluctuant to the touch. This effusion may become absorbed after the same fashion as in contusions elsewhere, and no palpable sign of a former injury remain, or it may be marked by a depressed and contracted scar which represents the former injury, or, as it not infrequently happens, it may give rise to a nephritis, a nephritic abscess, a pyonephrosis, or a pyelitis.

Gunshot injuries of the kidneys are by no means rare accidents in cases of penetrating wounds of the abdomen. Otis,<sup>1</sup> out of 1072 cases of shot injuries within the abdominal cavity records 78 cases of shot injuries of the kidney. However, where there is a shot injury of the kidney, one or more of the other abdominal organs are almost inevitably wounded. Perhaps the intestine more than any other viscera complicates the renal injury. Hæmorrhage in these cases is usually large, and frequently determines a lethal ending.

<sup>1</sup>Med. and Surg. Hist. of War of Rebellion, 2d Surg. Vol.

The blood alone may find its way into the circumrenal structures or into the peritoneal cavity. Where the injury involves the pelvis the extravasation is mixed with urine. The kidney may be injured through a missile in any direction, and to almost any degree, from a simple perforation to a perforation with the loss of a considerable portion of the kidney structure, or even to a shattering of the entire organ. The relative effects of the different varieties and sizes of balls has been a matter of considerable conjecture, discussion and experimentation. It can be safely stated that, as a rule, the size of the wound is in proportion to the size of the missile. However, this has many exceptions, and these exceptional effects have been attributed to a variety of influences.

The size being the same, the effect is very much moulded by its force and velocity, the character of weapon and the peculiarity of the ball. A ball traveling under diminished force is more apt to produce a lacerated puncture than one moving with great force and velocity, which generally produces a clean perforation with little or no laceration, and an almost inappreciable loss of structure.

A ball fired from a rifle created, as a rule, a greater injury than the same sized ball fired from a pistol. A difference in severity existed between a "long" and a "short" shell, the difference being in behalf of the "long." A Flobert was irregularly trimmed with a knife and thus fired. This was repeated several times, and in each instance the injury was largely in excess to that of one produced by a smooth ball. In a few the injury thus created was comparable with that of one produced by a .32 or .38 ball. The charges in shells of the same class are also frequently of very different propulsive power, which tends to control the force and velocity of the missile.

Repair under the proper conditions is frequently obtained, and where this results the track of the ball contracts and a small column of cicatricial structure completes the defect. If there is a loss of the renal structure and the same result occurs the site of injury is usually marked with a depressed scar. Finally, the kidney proper may also be injured through stabs

by means of a knife, or other pointed instruments, or as in military practice, through bayonet punctures.

Notwithstanding the size and its protected position, we have, nevertheless, a few authenticated cases of injury of the ureter. Of these we may mention the cases of Barker,<sup>1</sup> Stanley,<sup>2</sup> Poland,<sup>3</sup> and the much quoted case of the Archbishop of Paris, as examples of these injuries. This duct has been injured in various ways, directly through a shot injury, as in the case of the Archbishop, or through a contusion, as in Mr. Barker's case, and several times it has been directly injured in abdominal and obstetrical operations. Mr. Newman remarks that injury to the pelvis of the kidney without penetration of the abdominal wall is as rare as rupture of the ureter. It has been observed that soon after a rupture of a ureter, a pseudo-hydronephrosis has ensued, from infiltration of the urine into the surrounding structures. Resulting from an injury, the ureter may undergo contraction, producing a stricture which subsequently causes a hydronephrosis, destroying the organ and necessitating its removal. An instance of this is recorded by Dr. Pye Smith<sup>4</sup> in which a large hydronephrosis of the left kidney was produced from a kick received two years previously, and similar cases are mentioned by Mr. Croft and Dr. Harrison.

*Symptomatology.*—The symptoms referable to lesions of the renal organs can be divided into those relative to the constitution at large and those of a local nature. The constitutional symptoms consist of a rapid, feeble pulse, lowering of the bodily temperature, pallor, nausea, vomiting, muscular relaxation and in short the typical signs of collapse. The degree of collapse, however, in these, as in other instances, of injuries about the abdomen does not always correspond with the amount of the injury. There may be a severe injury, with little

<sup>1</sup>A. E. Barker, Dict. Pract. Surg. Heath. Vol., I., page 864.

<sup>2</sup>Royal Med. Chir. Trans., Vol. XXVII.

<sup>3</sup>Guy's Hosp. Reports, 3d Series

<sup>4</sup>Newman on Diseases of the Kidney Amenable to Surgical Treatment. Page 326.

tle or no evidence of shock, or vice-versa. The emotion and other influences frequently play an important rôle in determining the degree of shock. In view of the vascularity and the liberal nerve supply, injuries of these organs are peculiarly liable to be followed by severe shock. Again, the shock is not always entirely dependent upon renal injury, *per se*, for in a large number of instances there is more or less injury to the other organs, which renders the analysis of cause and effect in many of these cases difficult. In those that are attended with a breach in the kidney structure, the amount of hæmorrhage is frequently sufficient to materially augment the constitutional symptoms. Occasionally, the condition of collapse gives way to that of a comatose state, which speedily ends in dissolution, or later, when the collapse has passed off, the symptoms of peritonitis make their appearance.

Soon after the reaction is fairly inaugurated, the local symptoms, which were hitherto largely masked by the constitutional depression, become more evident. Notable among these we have hæmaturia, pain, repeated attempts at micturition, or even anuria, muscular rigidity, fullness in the loin and the appearance of urine at the external wound.

Hæmaturia is, perhaps, the commonest and most important symptom of a renal injury. Its absence, however, is by no means a certainty of their escape, nor is its appearance an absolute sign of their involvement. Even in injuries about the lumbar regions we must not be misled by this symptom. Illustrative of this point, Mr. Newman records an excellent example.

"A boy fell from a distance of twelve feet and alighted on his side, which struck violently against the edge of a packing box. Was picked up suffering from an ecchymosis over the right eye and over the left lumbar region. The boy regained consciousness, complaining only of symptoms about the head, the hæmaturia in the meantime continuing. Minute inquiry elicited the fact that red urine had been passed previous to the injury. The boy passed on to recovery and subsequent examination proved the presence of a small papilloma in the bladder from which blood continued to flow at irregular intervals."



A variety of causes may contribute in creating the appearance of blood in the urine. In an analysis of one hundred cases, Mr. Harrison<sup>1</sup> found thirty dependent upon renal calculi, twenty upon enlarged prostate, thirteen upon tumors mostly malignant, fourteen upon vesical calculi, two upon traumatism and the rest divided up principally among tubercle, stricture, cystitis and a variety of other causes.

When hæmaturia occurs, it may make its appearance in from a few minutes to a few days after the reception of the injury. It may be slight, amounting to only a darkening of the urine, or, again, it may be profuse and attended with clots. The clots may assume the shape of the uriniferous tubules, the ureter or may accumulate within the bladder, causing a distention of this organ.

The absence of hæmaturia in an injury of the kidney may occur in various ways. The injury may be confined to the subcortical portion of the kidney, in which event the blood in place of finding its way into the urine is extravasated into the surrounding structures. Again, the organ may be injured to such an extent as to completely arrest its secretion. The secretion may also be arrested from the formation of a thrombus in the renal vessels. Erichsen<sup>2</sup> mentions two cases in which the absence of the hæmaturia was due to an arrest of the secretion dependent upon an extensive injury of the kidney, both cases ending fatally. Aside from these, the absence of hæmaturia may also be dependent upon a division of the ureter or the obstruction of its lumen.

The arrest of a clot within the ureter may determine a delay of this symptom and give rise to another condition resembling a renal colic.

Soon after the hæmaturia ceases, the urine may become albuminous which may last for some time and be associated with the presence of blood corpuscles, pus, mucus, renal epithelium, or casts, clearly denoting a subsequent inflammation of this organ.

Pain is another common attendant upon a renal injury. This is generally of a dull, aching character, increased with the re-

<sup>1</sup>Reginald Harrison, *Times and Register*, Aug. 9, 1890.

<sup>2</sup>Erichsen. *Science and Art of Surgery*, vol. i, p. 822.

spiratory movements. The pain, which may be variable in degree and at its onset confined to the lumbar region, soon spreads through the lumbar and sympathetic nerves to the other parts of the abdomen, to the testicles and to the upper part of the thigh. Frequently this is marked by a retraction of the testicle. When the lumen of the ureter becomes clogged, as from a clot, the pain becomes intense and very much resembles that of a renal colic.

Fullness in the loin is frequently observed in injuries of the kidney. This fullness, for it seldom amounts to a distinct swelling, may be due to the injury of the abdominal wall alone or it may be due to the injury together with the extravasation of blood and urine, or even both into the surrounding structures. Later on, however, this fullness may be replaced by a distinct swelling, dependent upon the formation of a hydronephrosis, pyonephrosis, perinephritic abscess, or even a urinary cyst. Difficult micturition, or even complete anuria is not uncommonly met with in renal lesions, the complete absence of urine may be dependent upon the formation of thrombi within the renal vessels, upon an injury involving both kidneys, or an impaction of blood clot in the orifice of the urethra or neck of the bladder or an inhibitory nervous influence. In Mr. Poland's case<sup>1</sup>, the almost complete absence which persisted for the last six days of the patient's life was dependent upon a thrombus in the vessel of one kidney and the laceration and extravasation of urine in the other.

Another common attendant upon renal injuries, is a spasmodic contraction or rigidity of the abdominal muscles.

Lastly we have as a symptom of renal injury the escape of urine at the external wound. This symptom, however, is not a common one and when it occurs is indicative of an injury of the pelvis or ureter. The escape of urine externally may occur soon after the injury, or it may be delayed for several days or even for a week or more; and, when this does occur it furnishes the only absolute sign of an injury of the kidney.

*Diagnosis.*—The remote position of the kidney, its close proximity to the neighboring organs, and its intimate sympa-

<sup>1</sup>Guy's Hosp. Reports. 3d. Ser. Vol., 14.

thetic connections all serve to obscure the outlines and render difficult the diagnosis of a renal complication in injuries of the abdomen.

The only symptom indicative of absolute injury is the escape of urine, externally, and, since this only occurs in the fewest number of cases, penetrating wounds which form the lesser half of renal injuries and not even in all of these, we can easily appreciate the difficulty which frequently befalls the surgeon in their detection.

Apart from the above, hæmaturia is perhaps the most constant and valuable symptom occurring in these cases.

Following these we have pain, interference with micturition, rigidity of the abdominal muscles and a fulness in the flanks. If, there is a history of a direct or indirect injury to the abdomen, coupled with more or less constitutional impression and the subsequent appearance of hæmaturia, pain, muscular rigidity, difficult micturition, all of which lasting for a considerable time and marked with a tardy convalescence, sufficient grounds for the inference of a severe contusion or laceration are at hand.

Too much importance, however, must not be attached to any of these symptoms. Where the injury is of a trivial nature, the symptoms are frequently of such an indefinite character that an exact diagnosis is impossible. The diagnosis of a renal injury in penetrating wounds is not fraught with the same amount of difficulty that attends those of a sub-parietal nature. Although in shot injuries of the abdomen the damage is generally distributed over a number of the abdominal organs we are confronted with a more suggestive clinical picture as regards the renal injury.

In addition, experience has amply taught us the importance of the rule as regards the necessity of an early exploratory incision, in penetrating wounds for the thorough inspection and repair of the existing damage. The peculiar nature, the manner of their reception and the topographical relation all aid in rendering the diagnosis of stab injuries of this organ comparatively easy. It is very fortunate that an injury of the pelvis or ureter is of a rare occurrence, since the diagnosis of such a lesion is by no means of simple performance.



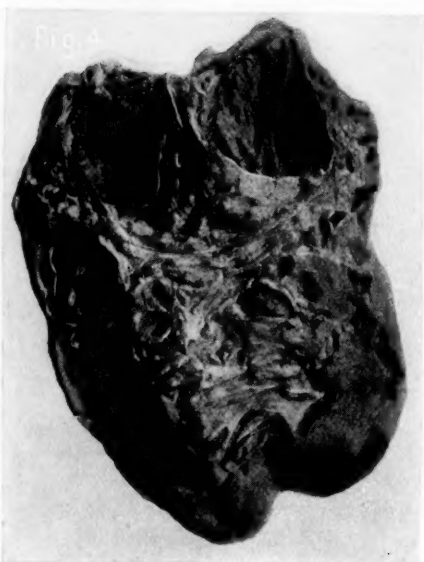
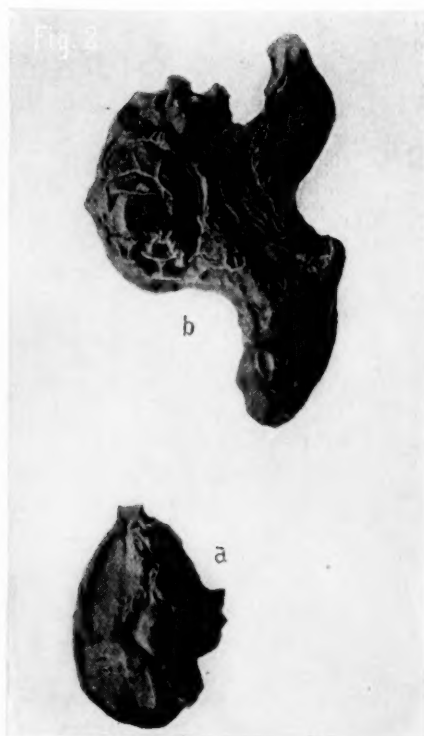


FIG. 1. (A)—Showing the result of a lateral resection of the kidney, with splenic adhesion.  
 (B)—Small abscess cavity in spleen.  
 FIG. 2. (A)—Result of longitudinal resection of a portion of kidney.  
 (B)—Incomplete union occasioned by peri-nephritic suppuration resulting from an infection through the external wound.  
 FIG. 3.—Showing imperfect union from premature absorption of catgut stitches.  
 FIG. 4.—Interior of abscess cavity in the upper portion of a kidney and supra-renal capsule.

In the few recorded cases the principal points of note were "the absence of severe shock, the appearance of two worm-like clots and the formation of a fluctuating tumor;" or, if the injury is of the penetrating variety there may be an escape of urine externally.

*Prognosis.*—From the foregoing remarks under the pathology and symptomatology of these injuries it is hardly necessary to repeat, that in view of the uncertainty which surrounds these injuries, the prognosis must need be very careful. While wounds of the kidney heal very readily, and while the outgrowth naturally depends upon the amount of the injury, it remains that frequently, apparently trivial injuries give rise to unfavorable consequences which not uncommonly end in a fatal termination. One of such was observed by the writer in a recent autopsy.

The case was that of an elderly man of perhaps 55 years of age, whose occupation was that of a hostler in a large stable, which work frequently exposed him to kicks from the animals. On New Year's day he was subjected to one of such accidents. Upon this occasion he received an injury of the right leg, and at the same time one in the lumbar region. From this he suffered considerable inconvenience, but was able to make his way to his home some distance off. After a rest of a few days he again attempted to resume his work. In this partly disabled condition he continued to work more or less, feeling at times comparatively easy. On the 17th of the same month he suddenly grew worse and after suffering for a few hours, expired.

At the post-mortem no external signs of violence were visible, save that of a very slight discoloration about the knee and a marked œdematous condition of the entire leg below this point. The heart was slightly dilated and in addition there were evidences of a chronic bronchitis and some marginal emphysema. General pleuritic adhesions were present upon both sides. The liver was in a cirrhotic condition. Both kidneys were movable. The upper third of the left kidney and the supra-renal capsule were filled to extreme distension with a soft, white and solid purulent matter. The bladder was incised and found containing a very small quantity of normal



looking urine. If the damage is slight, the symptoms may pass off and the patient appear seemingly recovered, while in reality the injury is gradually merging itself into a new condition.

It is to be remembered that not infrequently a nephritis, a pyelo-nephritis, a nephritic or peri-nephritic abscess result from such injuries. If the damage is severe the prognosis is always bad, the patient may either succumb to shock in a few hours, or life may be terminated later on from an excessive hæmorrhage. That the patient may recover even in the severest of these injuries there can be no doubt. Mr. Morris has recorded in proof of this a few striking examples.

There is even upon record a case<sup>1</sup> in which recovery followed a laceration of the kidney and the obliteration of the corresponding ureter, the patient finally dying of a granular degeneration of the opposite kidney. Should the patient, in the event of a severe injury, pass beyond the period for the occurrence of death from shock or hæmorrhage, the end may yet be determined by a peritonitis, or by the destruction of tissues from infiltration, or by the protraction of a suppurative process within or about the kidney or bladder, or lastly by the sudden rupture and discharge of an abscess into the peritoneal cavity.

Again, the prognosis may be rendered unfavorable by the involvement of the other organs within the abdominal cavity. Of these the liver is most frequently injured in connection with a renal lesion. Mr. Morris, who has written thoroughly upon this subject, refers to five dangers to be apprehended soon after the reception of the injury.

"First.—Continuous and excessive extravasation of blood leading to death by syncope within a few hours or a day or two.

"Second.—Peritonitis, either as the direct effect of the violence or the tension and ulceration of the peritoneum due to the accumulation of blood and urine which has been extravasated behind the peritoneum.

"Third.—Inflammation and suppuration of the peri-nephritic tissue, and:

<sup>1</sup>Trans. Path. Soc. London. Vol. xi, page 140.

"Fourth.—Occlusion of the ureter by blood clot and the retention of urine within the cavity of the kidney, and its attendant effects of hydro-nephrosis, pyo-nephrosis, pyelo-nephritis, or renal abscess.

"Fifth.—Simple traumatic nephritis."

Otis<sup>1</sup> has recorded 78 cases of shot injuries of the kidney of which 26 recovered. Of these 26 there were 13 upon the right side, 12 upon the left and one in which this point was omitted. In an injury of the right kidney the liver is frequently implicated, whilst in that of the left we have the spleen, stomach, or ascending colon, which not uncommonly suffer in the same accident. Although the prognosis of a shot injury of the kidney alone is by no means favorable, the gravity is naturally increased by the complication of an injury to one or more of the other abdominal organs. An injury of the urinary duct is justly regarded as a serious accident, necessitating in the majority of instances a removal of the organ.

Where the injury is not accompanied with too much laceration recovery may occur for a time, only to be succeeded by a stricture of this duct with an accompanying hydro-nephrosis and destruction of the organ.

*Treatment.*—The treatment of these injuries naturally varies with the character of the lesion. The most pertinent question which addresses itself to the judgment of the surgeon is the determination of the opportune moment when active interference is demanded. In some, the boldest measures are indicated from the very onset of the injury, while in others complete recovery occurs from a conservative or purely medical line of treatment. The fulfillment of this can only be hoped from a careful knowledge of the symptoms and a very close study of the progress of the case. Even with all this, the course, and symptoms are frequently so vague that in spite of the most careful attention, the ripest opportunity is frequently lost and the organ which was within our efforts is not only lost, but the case often terminates in the death of the individual.

For the sake of clinical reference the treatment is best divided into that of the contusions and lacerations, that of the

<sup>1</sup>Medical and Surgical History of the War of the Rebellion. Second surgical volume.

shot and stab injuries, that of the injuries of the duct, and lastly the treatment of the conditions consecutive to the injury. Contusions and lacerations.

In this variety the imperative indication is the enjoinder of absolute rest in bed. To still further fulfill this demand and for the relief of the pain, the administration of opium should be employed. The bowels should be somewhat constipated and if moved, this should be accomplished by means of a bland enema. In order to loosen the solid residue which tends to increase the vermicular motion and favor the dislodgment of a clot, the food should partake of the nature of a light and a liquid character. All stimulants and substances that are likely to increase the action of the kidneys should be carefully avoided. For the arrest of the hæmorrhage, various remedies have been urged, prominent among which might be mentioned such drugs as ergot, iron, gallic acid, alum, acetate of lead and opium.

But at best, it seems that very little can be expected from these, for if the hæmorrhage is severe enough to be of sufficient note, such drugs can hardly be hoped to supply the want. On the contrary, if it is slight, the hæmorrhage can be expected to be arrested by an absolute quiet, secured through the opium or the use of a full dose of ergot internally, or ergotine sub-cutaneously may also contribute to this end. If any decided benefit is to be derived from any of these it can best be expected from the opium and ergot.

In addition to these, venesection has been recommended in certain strong and healthy individuals with the hope of lessening the blood pressure and diminishing the danger of a rupture into the peritoneal cavity. Locally, the strapping of the affected side and the application of ice externally are to be remembered as adjuvants in securing an immobility of the injured side and in assisting the control of the hæmorrhage. In those cases that are marked with a transient collapse, slight hæmaturia, a limited degree of pain, with a slight area of dullness and with practically little or no fulness, the surgeon can be content with such steps as the careful regulation of the diet, the immobilization of the injured side through the application of adhesive strips applied from the spine to the linea

alba, the observance of perfect quiet in bed assisted by the administration of opiates and the checking of the hæmaturia by means of the application of ice externally, and the use of ergot and morphine internally.

An attempt can be made through this line of treatment to create a favorable termination, the surgeon in the meantime holding himself in readiness to assume a more active rôle upon the appearance of any untoward symptom. Should, however, the case be one marked with a notable degree of collapse, persistent or an exaggerated hæmaturia with a distinct fullness in the loin and a considerable area of dulness, it becomes the surgeon's imperative duty to, as promptly as is consistent, explore the injured region. Should the laceration not be too extensive, as for instance a complete division of the organ, an attempt should be made for its preservation. With this end in view, the surrounding region should carefully be freed of all blood clots and cleansed by a thorough irrigation with a sublimate or Thiersch's solution. As for the rent in the kidney, this should be carefully and thoroughly tamponed, together with the surrounding space and, if needbe, the external wound with sublimated or iodoformized gauze.

This can be allowed to remain until all danger of hæmorrhage is past, or until indications arise requiring an earlier removal, the tampon being renewed as often as the urgency of the case may demand. Should the kidney be completely severed, or severely lacerated with several deep fissures, or in a softened and broken down state, nephrectomy is the only alternative. But as already mentioned, it is a very delicate question for decision, to recognize those cases which demand immediate interference, those which require no interference, and those in which operative measures are required secondarily for the relief of the condition, or the correction of a process consecutive to the injury. The exploratory incision, not only affords an accurate means of diagnosis, but allows a more rational plan of treatment, besides affording an easy exit for any extravasated urine and the removal of any clots.

Gunshot injuries of the kidneys are justly to be regarded as serious accidents. This is dependent upon the profuse hæmorrhage which attends these cases and upon the frequency with

which they are accompanied by lesions of other abdominal organs.

The means of controlling the hæmorrhage which has always been an important question in the treatment of these cases, has been enlarged upon in these experiments.

For the purpose of management these injuries have been divided into four classes :

First.—Those in which the injury amounts to a superficial laceration, the missile grazing the kidney and carrying with it a portion of its structure, with a remaining surface not unlike in appearance to that of a granulating wound. In these the hæmorrhage is dependent upon the number of vessels exposed and is not infrequently of a considerable amount. A second variety, which amounts to simply a perforation, with little or no appreciable loss of structure. Here the passage usually contracts until it is smaller than the ball itself. This variety is, by far, the safest in character and the most amenable to treatment. A third variety in which the puncture is attended with a loss of kidney structure. In these the wound of entrance is of the size of the ball, whilst that of exit is quite large and attended with the destruction of a portion of the kidney.

Lastly, a fourth class in which the kidney is lacerated beyond redemption or in which the renal artery or a large branch of the same either within or external to the kidney is ruptured.



FIG. 1. "Purse-string" suture applied to a gun-shot perforation.

In this class, the extirpation of the organ usually becomes the only alternative. Again, the missile may hopelessly injure either the pelvis or ureter. If the injury of the pelvis is created by a small sized ball, an attempt may still be made to preserve

the organ, but where the pelvis is considerably lacerated, or the ureter severely wounded, nephrectomy is the most effectual means of dealing with these cases. Although, even a large branch of the renal artery be divided an effort may still be made to save the organ. The first step in the treatment of any of these, is the establishment of the positive existence of an injury and for this end the recognized rule is to be remembered, that apart from the most exceptional instances exploratory laparotomy should be performed.

The aseptic nature of gunshot wounds in external regions, has long since been pointed out by Bergmann, Esmarch and others, and, acting under the impression that the same would be true as regards such wounds within cavities, experiments were made with the intention of demonstrating this and the establishment of operative measures for their treatment based upon this principle. At first such wounds as are depicted in the second class were treated by transverse sutures over the orifice of the wound, in various directions. Although the results were entirely satisfactory as regards the recovery, this was finally replaced by a "purse-string suture," which has for

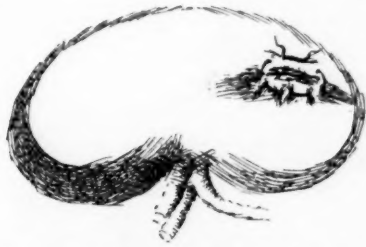


FIG. 2. Gun-shot perforation sealed by a "purse-string" suture.

it the advantages of being easier and more readily applied, in being less liable to tear, and, lastly, in its remote relations to the raw edges of the wound which are thus drawn together in their original condition.

In applying this suture, as well as in all operative procedures upon the kidneys, care should be observed to preserve the capsule and circum-renal structures which contribute so largely to the strength of the purchase. Where, in a deficiency, or an absence of these, strength is desirable, the stitches can



be introduced deeper into the medullary portion, which through its extra quantity of connective tissue, affords a stronger grasp for the stitches.

The orifice thus closed, is securely sealed against hæmorrhage, organization soon follows, which leads to an early and

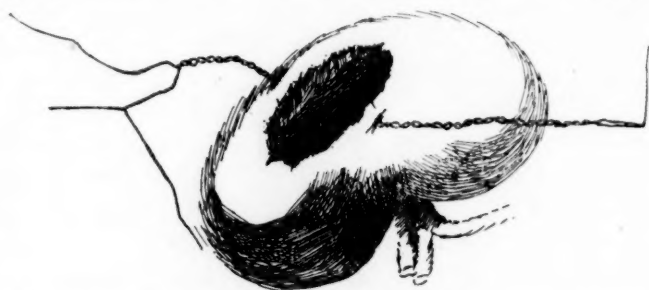


FIG. 3. Introduction of a twisted, double suture for the control of hæmorrhage by means of a double "purse-string" contraction.

definitive healing. In those injuries of the first class, the hæmorrhage is usually severe. Resection was practiced in some of the experiments for the control of this. The "purse-string suture" applied about 1 centimeter from the edge was successfully tried in smaller wounds and finally likewise adopted in wounds of a larger size. Thus treated, the hæmorrhage

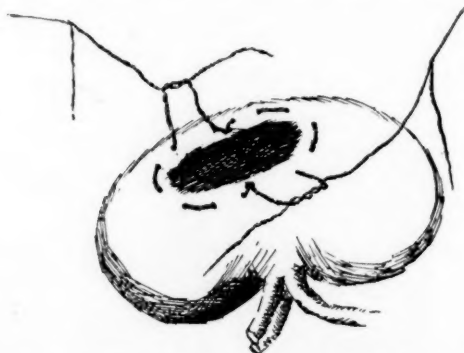


FIG. 4. Showing the application of a double "purse-string" suture for the arrest of hæmorrhage in large superficial gun-shot wounds.

promptly ceased, the uneven granular surface was absorbed, leaving behind a smooth, depressed scar of the former lesion. Where the wounded area is unusually large the compression

obtained through a single suture is occasionally insufficient. In such instances, the surface is divided into halves and each half separately constricted by means of a suture proper to itself. Should a rebellious vessel still escape compression, this can be secured by a separate stitch introduced for this purpose after the manner of transfixion. This measure can be supplemented with the sear of a Paquelin cautery. The value of this, however, can hardly extend beyond the arrest of an oozing, which is, as a rule, easily controlled by means of the suture.

In those injuries that are characterized with a small wound of entrance, while that of exit is large and marked by a loss of

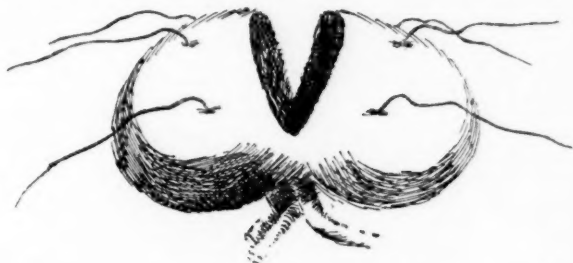


FIG. 5. Introduction of stitches for the closure of the deeper portion of a resection.

structure, there are two procedures open, the choice of which being largely dependent upon the location of the injury. When the wound is near, or upon the external border, a resection of the entire injury is perhaps the safest and most feasible measure. Should the wound, upon the other hand, be located near the center of the organ the application of a "purse-string suture" to both openings, or the smaller opening may be sutured while the larger is tamponed with sublimate or iodoform gauze and drained through a lumbar incision. Where resection becomes necessary the triangle which is removed should include only the necessary structure and if possible should reach short of the pelvis of the organ. The observance of this practically excludes the dangers of fistulæ and the extravasation of urine. In bringing together the divided surfaces, the entire wound from top to bottom should be united by means of deep interrupted stitches of chromicized cat-gut or silk introduced about 2 or 3 centimeters from the edge, while the superficial edges are

opposed by another row of sutures. This can be still further secured by suturing over the divided edge the capsule and circum-renal structure.

Although if the pelvis is laid bare, it should be thoroughly irrigated and freed of all clots before closure of the wound is undertaken. For the control of the most troublesome obstacle in operations upon the kidney the author has devised a clamp for the compression of the renal artery, with the hope of securing a bloodless, or almost bloodless operation. In stab injuries of this organ, the external wound, if necessary, should be enlarged and the exact character of the renal injury determined. If the

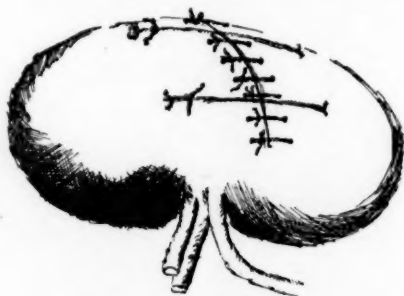


FIG. 6. The method of closing resections and deep exploratory incisions.

wound is such that it will admit of an easy apposition, and from the nature of its production the surgeon feels safe as to its aseptic nature, it should be closed just as though it was a simple incision for the purpose of exploration. Or, the closure can be preceded by an irrigation of the wound with a sublimate solution, 1 x 2500.

If it is evident that for some reason these measures cannot be fulfilled, the surgeon has left, as a last resort, the tamponade and drainage through the loin. Penetrating wounds involving the pelvis should be closed by means of a single or double row of sutures. For injuries of the ureter, unless singularly slight, nephrectomy seems the only alternative, for even though union should result, the dangers of a stricture with the subsequent risk of a hydronephrosis and destruction of the kidney are not to be lost sight of.<sup>1</sup> Injuries of the kidney are frequently attended with secondary complications which require separate interference for

<sup>1</sup> Nussbaum has successfully resected a portion of this duct for a wound of the same during an ovariectomy. *Surgery of the Kidneys*—J. Knowsley Thornton.

their correction. Among these, a very common accident is the accumulation of blood-clots within the bladder.

Generally, when hemorrhage occurs into the bladder it is promptly evacuated, but occasionally the blood coagulates and not infrequently gives rise to a considerable annoyance. Should the coagulation amount to a few small clots they seldom give rise to any trouble, as the urine exerts a solvent influence thereupon and favors their removal.

Should this be insufficient, the bladder should be thoroughly washed with a mild solution of boric acid, and, if necessary, an evacuating apparatus (Bigelow's) employed for the removal of the clots. Where these measures fail, cystotomy should be performed without further delay. Another common attendant upon these injuries is the extravasation of blood, or urine, or both into the surrounding structures. Although the occurrence of the former is not necessarily dependent upon an injury of this organ, for hæmatomas of considerable size have resulted from the rupture of muscles in this region, or from anastomoses between external and internal arteries, or lastly, from an aneurism of some intra-abdominal artery. Moreover, it is not always an easy matter to discriminate between the extravasation of blood and urine and where there is a perceptible fullness or swelling between either of these, and the swelling caused by an enlargement of the kidney itself. For the discrimination of these, Rayer has suggested the point, that extra-renal extravasation is, as a rule, not as distinct in its outline as in a fullness dependent upon intra-renal extravasation. This, however, is an exceedingly fine discrimination, and in real practice is often quite difficult to execute. The effusion may occur rapidly, as from the rupture of a large vessel, and with the usual signs of a severe hemorrhage.

Frequently it assumes an enormous size, dissecting away the peritoneum, permeating the surrounding structures, and occasionally finding its way along the Psoas and Iliacus muscles into the groin.

Where the diffused hæmatoma is of a rather slow origin, its detection and differentiation is fraught with some difficulty. It may remain unabsorbed, or it may pass through a process of absorption and disappear, or, finally, it may break down and become converted into a nephritic or perinephritic abscess. The

course of these extravasations should be carefully guarded, lest they break down and suppurate, bursting finally into the general peritoneal cavity, or dissecting up the neighboring muscles, or burrowing along the Psoas muscle finally to open spontaneously in the groin, or thigh. Probatory punctures with a strictly aseptic aspirating needle should be repeatedly made in different directions. At the appearance of the slightest evidence of pus, early incision through the loin and drainage should be resorted to.

Closely allied to the foregoing is the extravasation of urine. The manner of its distribution, the nature of its production and the obscurity of the symptoms not infrequently make it a difficult matter at times to discriminate between these two conditions. Like the former, its origin may be either of a rapid formation or its growth may be extended over several weeks ere sufficient signs or fullness are present to excite suspicions of an extravasation.

The extravasation may become partly or entirely absorbed, it may excite inflammation and suppuration of the surrounding structures leading to an abscess, which may follow the same course as mentioned in the preceding complication, or it may become encapsulated within a boundary of inflammatory formation producing a pseudo-hydronephrosis.

The infiltrated urine may become mixed with pus, or, as in Mr. Barker's case, concretions of a phosphatic nature may be formed within the sac. The behavior of tissues when infiltrated with urine has been, to say the least, a most interesting subject. In some, the normal urine has excited an intense inflammatory action, ending in suppuration and destruction of the tissues, while on the contrary there is ample evidence of the harmless nature of this fluid, at least under certain circumstances. The experiments of Simon<sup>1</sup> in this direction have conclusively indicated this. \*

In short, the experiments have demonstrated that normal acid urine is readily absorbed when injected into the tissues in from a dram to a pound quantities; that urine, more or less ammoniacal or containing pus, is capable of producing a progressive inflam-

<sup>1</sup> *Ueber die Einwirkung des Urins und Speichels auf die nachte d. i. nicht mit Epithel bekleideten Gewebe v. Prof. G. Simon, Heidelberg. Deutsche Klinik.* April, 1869. Nr. 15.

mation of the tissues and a gangrenous condition of the skin. He has further added clinically to the strength of those experiments by using for the sponging of wounds in certain plastic operations, urine in place of water, obtaining, notwithstanding this, primary union in every instance. This author is inclined to the belief that the evil effects of the normal acid urine are not due to its direct action, but rather to an interference with the nutrition of the structures which it causes by separating the muscles with its presence in the intermuscular spaces and by elevation of the skin from its underlying bed, thus seriously compromising the nutrition.

Furthermore, we have the experience of Thornton,<sup>1</sup> which speaks in a similar tone. During a difficult ovariectomy this operator cut the left ureter, which accident was only discovered the following day. Meanwhile the urine continued to flow into the peritoneal cavity, finally making its exit through the drainage tube, saturating the dressings. Although this had been going on for twenty-four hours the peritoneum was not even red. The case recovered soon after a nephrectomy.

When the presence of extravasation is established, it should be promptly relieved for the protection of the surrounding structures. For the fulfilment of this measure, we have the choice of three procedures:

First.—The simple aspiration, repeated if necessary, has in a number of instances been attended with success. Where the sac continues to refill, incision and drainage is indicated. Should the condition continue, dependent upon a stubborn fistula from the pelvis or a severe wound of the kidney, or the ureter, nephrectomy is in most instances the proper step for its relief.

Another complication of note is the appearance of peritonitis. This may occur primarily from the injury itself, or, it may follow secondarily upon some operative measure. The fact of its occurrence, however, can only be regarded as a logical proof of the presence of some condition which requires an active interference. In nearly all of the penetrating and many of the non-penetrating wounds exploratory incision is indicated and carried into effect. In the excepted cases, unless the condi-

<sup>1</sup>J. K. Thornton, *Internat. Med. Cong. Rep.*, 1884. Vol. II.



tion is incompatible with such a step, the appearance of peritoneal symptoms should demand an early exploration.

Where the peritonitis follows secondarily to an abdominal section, made for the repair of such an injury, the use of salines should be employed. For the fulfillment of this end a variety of salines are at hand, none, perhaps, acting with as much certainty and satisfaction as the magnesium powder (oxide) administered in a carbonated beverage.

Should the use of these fail in favorably influencing the peritoneal reaction, an exploration is in order, unless an attending circumstance contra-indicates this step. Apart from these, occasionally there occurs a nephritic or perinephritic abscess, a traumatic nephritis, a pyonephrosis or hydronephrosis, or a host of other sequelæ and complications which more properly deserve an undivided consideration.

#### EXPERIMENTAL OBSERVATIONS UPON INJURIES OF THE KIDNEY.

EXPERIMENT 1. Aug. 28. Small size dog. Weight 5.5 kilograms. Kidney exposed and shot with a .22 ball from a S. & W. pistol. The ball penetrated the kidney transversely, midway between the external and internal border, near the center of the viscus. The wound of entrance was small and closed by sealing over the orifice with silk. This procedure effectually arrested the hemorrhage from this opening. The wound of exit, however was large and could not be subjected to this treatment. In lieu of this, triangular excision of a portion including the lacerated defect, was resorted to.

The cut surfaces, which bled freely, were each covered with strips of omentum, and the walls brought together by deep and superficial interrupted sutures.

This approximation required a few additional sutures at the inner angle before the hemorrhage ceased.

Given 4 Cc. Magendie's Sol. and removed.

Aug. 29. Walks with unsteady gait and refuses food.

Aug. 30. P. M. Very weak. Died this afternoon. Wound of entrance closed and of an apparently promising appearance. The resection and some distance beyond in a softened and broken down condition. Death from the effects of traumatism.

EXPERIMENT 2. Aug. 28. Small size dog. Weight 7 kilograms. Kidney exposed and shot with a Flobert from a S. & W. pistol. The

ball grazed the external border of kidney, creating a wound of about 1 Cm. deep and about 4 Cms. in circumference.

The lesion was treated by excising a triangular portion of the organ which included the entire wounded surface. The fresh surfaces were brought together by deep and superficial sutures which completely arrested the hemorrhage.

Given 4 Cc. Magendie's Sol. hypodermically.

Aug. 29. Very feeble, refuses food.

Aug. 30. Walks about, takes food and suffers great thirst.

Sept. 8. Apparently recovered. The animal was now subjected to a removal of the uninjured kidney.

Sept. 9. Refuses food, but seems otherwise very little affected by second operation.

Sept. 10. Takes food freely and appears lively.

Sept. 11. Same.

Oct. 18. The animal appears in perfect spirits. Has apparently gained in weight and shows no signs of the former operations. Sacrificed for the examination of the remaining kidney.

P. M. Kidney diminished in size. The site of resection marked by a slight omental adhesion and the edges rounded and partly gaping. Union of the surfaces being only partial and no fistula.

EXPERIMENT 3. Sept. 19. Large size dog. Weight 21 kilograms. Kidney exposed and shot with a .22 ball from a S. & W. pistol, the ball passing transversely through the center of the organ.

The orifices, which were small, were closed by a row of sutures.

In closing the wound upon the external surface, the circumrenal fat was utilized and drawn over the wound more securely closing the orifice. This effectually arrested the hemorrhage.

Given 4 Cc. Magendie's Sol. and removed.

Sept. 20. Refuses both food and water, but walks about and otherwise appears unaffected.

Sept. 21. Takes food and appears lively.

Sept. 22. Same.

Oct. 28. Killed to obtain the specimen.

P. M. Kidney in a firm condition, marked only by two small depressed scars.

EXPERIMENT 4. Sept. 22. Small size dog. Weight, 10 kilograms. Kidney exposed, and shot with a .22 ball from a S. & W. pistol. The ball passed directly through the long axis of the organ. Both openings were closed by silk sutures, which arrested the hemorrhage. Given 4 Cc. of Magendie's Sol. and removed.

Sept. 23. Drinks water freely and took a small portion of raw meat.

Sept. 24. Died towards evening.

P. M. Cavity contained about 200 Cc. of bloody fluid of a somewhat purulent character. Feeble adhesions between the intestines and omentum. External appearance of the wound unchanged. Upon section the track was found filled with a perfectly clean clot. Death from acute sepsis.

EXPERIMENT 5. Sept. 22. Small size dog. Weight, 6.5 kilograms. Kidney exposed and shot with a Flobert from a S. & W. pistol. The surface of the ball had been cut with a knife, giving it an uneven appearance. The ball passed directly through the long axis of the organ, creating at its entrance a small opening marked by several diverging fissures.

The wound of exit was very much lacerated and attended with a loss of kidney structure. The wound of entrance was closed with silk sutures, and that of exit was carefully trimmed, removing the prominent lacerated edges. The hemorrhage from this opening was partly arrested by means of interrupted stitches applied in different directions and partly by the implantation of the omentum. Given 4 Cc. Magendie's Sol. and removed.

Sept. 23. Refuses food and appears feeble.

Sept. 24. Takes a small quantity of food.

Sept. 25. Improving.

Sept. 26. Appears lively and eats with good appetite.

Oct. 5. Nephrectomy was practiced upon the uninjured kidney.

Oct. 6. Took a few ounces of milk.

Oct. 7. Appears hearty.

Nov. 23. Killed to obtain specimen.

P. M. Kidney firmly united and omental implantation strongly adherent.

EXPERIMENT 6. Sept. 29. Large size dog. Weight, 17 kilograms. Kidney exposed and shot with a .22 ball from a S. & W. pistol. The ball passed transversely through the kidney near the centre. The wound of entrance was small and closed with a continuous silk suture. The wound of exit was at least four times larger than the wound of entrance.

The closure of this was unsuccessfully attempted with interrupted silk sutures. The hemorrhage was finally arrested from this source by means of a purse suture. The contused tissue, which slightly

projected, was carefully trimmed away and the organ returned. The cavity was thoroughly cleansed and closed.

Given 4 Cc. of Magendie's Sol. and removed.

Sept. 30. Walks about. Drinks large quantities of water, but takes sparingly of finely-chopped meat.

Sept. 31. Appears hearty. Eats and drinks freely.

Nov. 3. Perfectly recovered. Nephrectomy was practiced upon the uninjured kidney.

Nov. 4. Refuses food and water.

Nov. 5. Takes both food and water.

Dec. 8. Lively. Eats and drinks heartily. Killed to obtain the injured kidney.

P. M. Small cicatrix marking the wound of entrance. Upon the opposite side there was an appreciable depression with a few adhesions.

EXPERIMENT 7. Oct. 19. Medium size dog. Weight 15.5 kilograms. Kidney exposed and shot with .22 ball from a S. & W. pistol. The missile shattered the lateral aspect and then passed through the kidney beneath a bridge of renal tissue. The whole track was resected, leaving a little over two-thirds of the kidney behind. Almost perfect apposition was obtained by a series of deep and superficial stitches. The kidney was thoroughly irrigated and returned. The cavity was washed and carefully sponged to free it from clots. The shock that followed this operation was quite marked and dependent largely upon the excessive hemorrhage. Given 4 Cc. of Magendie's Solution, hypodermically, and a rectal injection consisting of 300 Cc. of a warm solution of chloride of sodium, with 60 Cc. of dilute alcohol. The deep stitches in this experiment consisted of catgut that had been immersed in the tincture of chloride of iron and then dipped in the U. S. P. alcohol. Rallied from shock in about two hours.

Oct. 20. Refuses food and lays quiet.

Oct. 21. Remains in one place. Took a few ounces of milk and water.

Oct. 22. Took a small quantity of raw meat and water.

Oct. 23. Same.

Nov. 2. Has been progressing nicely. Presents a somewhat emaciated appearance, but eats well and appears lively.

Nov. 10. Nephrectomy was practiced upon the remaining kidney.

Nov. 11. Refuses food and water.

Nov. 12. Improved.

Nov. 13. Eats and drinks.

Nov. 16. Refuses food.

Nov. 17. Eats heartily again. Continued thus, being fed entirely upon a diet of raw beef, till Dec. 26.

Dec. 27. Refuses to eat and drink. Very emaciated and suffering from a diarrhoea.

Dec. 28. Refuses food. Diarrhoea increased. Stools streaked with blood. Animal quite weak.

Dec. 29. Condition exaggerated.

Dec. 30. Found dead. The animal in a very much emaciated condition. The bony prominences presented a raw and somewhat ulcerated appearance. These raw surfaces at times would heal, but only to break open and recur.

P. M. The animal had already been dead eighteen hours. The intestines only slightly congested here and there. The spleen small and quite hard. The kidney diminished in size, marked upon its external surface by two shallow fissures; upon its internal surface by an omental adhesion and a depressed cicatrix marked by several diverging cicatricial lines. At the upper extremity of the kidney there was adherent a globular body of about 5 Cm. in circumference, which from all appearance, seemed to be the supra-renal capsules, filled with a soft but thick, purulent matter. The kidney was firmly united and in a good condition. The superficial suture, which was a continuous one, still imbedded. The deep sutures were absent. The remainder of this kidney represented about five-eighths of its secreting surface. The spleen upon section revealed a small abscess cavity. Unfortunately, other organs not examined. Death very likely from the suppurative process, favored, in all probability, by a renal insufficiency.

EXPERIMENT 8. Oct. 19. Medium size dog. Weight 18 kilograms. Kidney exposed and shot with a .22 ball from a S. & W. pistol.

The ball took a superficial course, passing along the upper surface, tearing away a portion of the kidney, which left a lacerated bleeding surface. Resection was practiced, removing not quite as much of the kidney structure as in the foregoing experiment. The deeper parts were apposed by ferrated catgut and the superficial edges by means of silk. The organ was thoroughly irrigated and returned.

Given 4 Cc. of Magendie's Sol. and removed.

Oct. 20. Refuses milk and water and remains quietly in one place.

Oct. 21. Takes a small quantity of food and lies very quietly.

Oct. 22. Same.

Oct. 23. Great thirst. Refuses food.

Oct. 24. Found dead.

P. M. Cavity contained 700 Cc. sanguino-purulent fluid, no adhesions. Kidney softened and broken down. Death from extravasation of urine and septic matter into the peritoneal cavity.

EXPERIMENT 9. Oct. 10. Medium size dog. Weight 14.5 kilograms. Kidney exposed and shot with a .22 ball obliquely through its long axis. The wound of entrance was small and closed with a double row of silk. The wound of exit was large and in a lacerated condition. Closure of this was accomplished partly by the purse suture and partly by omental implantation.

Kidney sutured and given 4 Cc. of Magendie's Sol.

Oct. 11. Refuses food, but otherwise appears strong.

Oct. 12. Takes food and appears lively.

Oct. 13. Same.

Nov. 16. The dog appears lively, eats well and apparently perfectly recovered.

Nephrectomy was practiced upon the uninjured kidney. In the removal of the kidney the ligature slipped and a profuse hemorrhage ensued. It was only secured after enlarging the wound. Cavity was carefully cleansed and closed.

Given 4 Cc. Magendie's Sol. and removed.

Nov. 17. Walking about. Refuses food, but very thirsty.

Nov. 18. Same.

Nov. 19. Found dead.

P. M. Cavity contained 70 Cc. of sanguino-purulent fluid and a few feeble adhesions. The opposite kidney was found perfectly healed with implanted omentum adherent, together with a coil of intestine. Death from acute septic peritonitis.

EXPERIMENT 10. Nov. 1. Medium size dog. Weight 17 kilograms. Kidney exposed and shot with a .22 ball through its long axis. The wound of entrance was closed with a double row of silk sutures.

The wound of exit was partly sealed with a double row of sutures, assisted by an implantation of omentum.

Given 4 Cc. of Magendie's Sol. and removed.

Nov. 2. Refuses food and water.

Nov. 3. Takes a few pieces of raw meat and water.

Nov. 5. Refuses food.

Nov. 6. Anæsthetized and lumbar wound, which was gaping and of a necrotic appearance, carefully washed out, trimmed and enlarged. The kidney drawn into view and found very slightly gaping, with the



omentum adherent. The omentum carefully removed for inspection and closure of the deeper parts. The kidney was thoroughly irrigated and returned. Stimulated with hypodermics of whisky.

Nov. 7. Found dead.

P. M. Cavity clean. A few feeble adhesions. Death from septic peritonitis.

EXPERIMENT 11. Dec. 28. Large size dog. Weight 26.5 kilograms. Kidney exposed and shot with a .22 ball from a S. & W. pistol, creating a superficial laceration upon the surface of the organ. The bleeding surface was thoroughly irrigated and a purse suture applied. This effectually arrested all hemorrhage.

Given 4 Cc. of Magendie's Solution and removed.

Dec. 29. Up; appears lively and takes a quantity of raw meat.

Dec. 30. Same.

Jan. 20. Killed to examine specimen.

External wound almost entirely healed. The injured surface presented a depressed appearance with no diminution in the size of the kidney.

EXPERIMENT 12. Dec. 12. Large size dog. Weight 23 kilograms. Kidney exposed and shot with a .22 ball from a S. & W. pistol, the ball passing obliquely through the organ. Various sutures applied in different directions, but failed to arrest the hemorrhage. The kidney was in such a state of degeneration that no purchase could be obtained by any suture. Nephrectomy seemed the only alternative and was performed.

Dec. 13. Walks unsteadily and refuses food.

Dec. 14. Same.

Dec. 15. Takes a small quantity of milk.

Dec. 16. Presents a drowsy appearance. Slight diarrhoea.

Dec. 18. Diarrhoea increased. Indifferent to food. Expression stupid and very much emaciated in appearance.

Dec. 20. Condition about the same. Diarrhoea increased and streaked with blood.

Jan. 5. Found dead. From the last to the present date, the animal gradually lost ground. The appetite became more affected, the form more emaciated and the diarrhoea increased. The expression throughout was one of utter apathy.

P. M. Cavity clean. The remaining kidney enlarged, hyperæmic, granular and degenerated. The small intestines of an anæmic appearance, marked by hyperæmic patches. Death from nephritis.

EXPERIMENT 13. Dec. 31. Large size dog. Weight 19 kilograms.

Kidney exposed and shot with a .22 ball from a S. & W. pistol. The ball passed obliquely from the external to the internal border, severing a large branch of the renal artery and completely shattering the pelvis of the kidney.

The wound of entrance was sealed with a purse suture. Resection was unsuccessfully attempted for the wound of exit. Nephrectomy was indicated and performed.

Jan. 1. Up, and walking about. Takes a small quantity of meat.

Jan. 18. Recovered from the nephrectomy. Eats and drinks heartily. External wound almost healed. Nephrectomy was again performed upon the remaining kidney at 8 P. M.

Jan. 19. Refuses food and water. Remains quietly in the same place.

Jan. 20. No change.

Jan. 21. Same.

Jan. 22. Died sometime between 7 and 9 P. M.

P. M. Cavity clean. The intestinal mucous surface apparently normal.

Before death the animal appeared dull and indifferent.

EXPERIMENT 14. Nov. 13. Small size dog. Weight 6.5 kilograms. Kidney exposed and shot with a .22 ball from a S. & W. pistol. The ball passed through the long axis of the organ. The wound of entrance closed with a silk suture. That of exit closed in a similar manner and reinforced by a covering of omentum.

Given 4 Cc. of Magendie's Sol. and removed.

Nov. 14. Refuses food. Takes a small amount of water.

Nov. 15. Eats and drinks.

Nov. 16. Same.

Dec. 21. Recovered and subjected to another experimental operation.

EXPERIMENT 15. Jan. 10. Medium size dog. Weight 8 kilograms. Kidney exposed and compressed in two contiguous spots with blunt forceps. The instrument left a deep, blanched spot, which soon swelled up and became cyanosed for some distance beyond. Kidney returned.

Given 4 Cc. of Magendie's Sol. and removed.

Jan. 11. Up and takes food.

Jan. 12. Seems very little affected by the injury.

Jan. 21. Apparently recovered. Eats and drinks heartily. Killed to examine the specimen.

P. M. Kidney depressed in the spots corresponded to the injury. Evidences of cicatricial tissue around the seat of the former lesion.

EXPERIMENT 16. Jan. 10. Medium size dog. Weight 8.5 kilograms. Kidney exposed and lacerated by bending it up on itself. This produced a lacerated wound marked by a considerable degree of contusion. The laceration, which was double, measured about 3 Cm. in length, and about 1 Cm. in depth. Hemorrhage resulted to a notable degree. The surface was thoroughly irrigated and the edges of the laceration brought together by deep sutures of silk. Kidney was carefully returned.

Given 4 Cc. of Magendie's Sol. and removed.

Jan. 11. Refuses food. Walks about.

Jan. 12. Same.

Jan. 13. Eats a few pieces of raw meat.

Jan. 14. Eats sparingly. Appears apathetic.

Jan. 15. Refuses food.

Jan. 16. Refuses food.

Jan. 18. Eats and drinks.

Jan. 19. Same.

Jan. 22. Found dead.

P. M. Omentum and spleen adherent. The laceration gaping and covered with a yellowish suppurating surface.

Sutures still imbedded. A small abscess was found communicating with the laceration.

Death from exposure.

EXPERIMENT 17. Jan. 10. Medium size dog. Weight 9 kilograms. Kidney exposed and compressed with the same instrument that was used in the previous experiment, but with almost double the amount of pressure. The kidney enlarged and rapidly assumed a bluish color for some distance beyond the lesions.

Given 4 Cc. of Magendie's Sol. and removed.

Jan. 11. Takes a few pieces of raw meat.

Jan. 12. Same.

Jan. 13. Very much improved—appetite better.

Jan. 22. Appears recovered. Eats and drinks heartily and is apparently recovered.

Disappeared.

EXPERIMENT 18. Small size dog. Weight 6.5 kilograms. Kidney exposed and the clamp applied to the renal artery. An oval piece measuring 7 Cm. in circumference and 1 Cm. in depth was carefully sliced off. The raw surface was surrounded by a purse-suture intro-

duced about 1 Cm. from its edge. The clamp was released and hemorrhage in one or two spots at the lower half of the raw surface returned. An unsuccessful attempt was made to arrest the hemorrhage from these points by the sear of a Paquelin cautery. This arrested the hemorrhage in all but one small artery. The hemorrhage from this was finally arrested by a second suture introduced through the middle of the wounded surface, and brought around its lower border in such a manner as to include the lower half of the wound. Cavity was sponged.

Given 4 Cc. Magendie's Sol. and removed.

Jan. 11. Refuses food. Takes a few ounces of water.

Jan. 12. Eats and drinks.

Jan. 13. Same.

Jan. 27. Lively. Eats and drinks heartily.

Killed for further examination.

P. M. The wounded kidney was covered with adherent omentum and spleen in a very firm manner.

EXPERIMENT 19. Jan. 16. Small size dog. Weight 7 kilograms. Kidney exposed and severely compressed in three places. The organ very soon assumed twice its original size, became dark-blue in color and fluctuant to the touch. In this state the organ was returned.

Given 4 Cc. of Magendie's Sol.

Jan. 17. Appears feeble. Refuses food.

Jan. 18. Indifferent. Refuses food.

Jan. 19. Eats a few pieces of raw meat.

P. M. Dead. Kidney still marked with a deep blue, contused spot. The end was largely determined by exposure.

EXPERIMENT 20. Oct. 17. Medium size dog. Weight, 16.5 kilograms. Kidney exposed and shot with a .22 ball from a S. & W. pistol. The ball passed transversely through the medullary portion of the organ. The wound of entrance was small and the hemorrhage arrested therefrom by means of a silk suture. The wound of exit was large and stellate in appearance. Transverse suturing for the arrest of hemorrhage was unsuccessfully attempted. The purse suture was then applied and accomplished the desired end. This was reinforced by the implantation of omentum.

Given 4 Cc. of Magendie's Sol. and removed.

Oct. 18. Appetite fair. Appears lively.

Oct. 19. The same.

Nov. 20. Nephrectomy was practised upon the uninjured kidney.

Nov. 21. Refuses food.

Nov. 22. Eats and drinks.

Nov. 23. Same.

Jan. 3. Perfectly recovered. Killed for further examination.

P. M. The wound firmly repaired and apparently unchanged in size. Omentum adherent.

EXPERIMENT 21. Nov. 19. Small size dog. Weight, 4 kilograms. Kidney exposed and incised along its external border. This incision reached to a point about midway between the external border and edge of the pelvis. This was closed by a continuous silk suture. Good apposition and perfect hæmostasis was obtained.

Given 2 Cc. of Magendie's Sol. and removed.

Nov. 20. Up and appears lively. Eats hearty and is apparently unaffected by the operation.

Nov. 22. Same.

Dec. 26. Sacrificed for further examination.

P. M. Wound nicely united. Stitch visible beneath a layer of exudate.

EXPERIMENT 22. July 9. Small size dog. Weight, 7.5 kilograms. Anæsthetized. Spot selected in the linea alba shaved and disinfected. Six hypodermics of recently drawn urine were injected through this spot into the abdominal cavity.

Given 2 Cc. of Magendie's Sol. and allowed to come from under the anæsthetic. The animal showed evidences of uncomfört.

July 10. The posterior extremities weak and unsteady. This, passed away during the day.

July 11. Appears lively and takes food freely.

July 20. Recovered. Sacrificed for examination.

P. M. No signs of any adhesions visible.

EXPERIMENT 23. July 12. Small size dog. Weight, 5.5 kilograms. Kidney exposed and a triangular piece resected measuring 2 Cm. at its base and reaching almost into the pelvis. The surfaces were brought together by three deep interrupted catgut sutures and the edges approximated by a running silk stitch. The capsule was drawn over the raw edges and united by fine catgut sutures.

Given 2 Cc. of Magendie's Sol. and removed.

July 13. Appears fresh and at noon drank a small quantity of milk.

July 14. Appears lively and drinks milk freely.

July 28. Nephrectomy was practised upon the opposite kidney.

July 29. Refuses food.

July 30. Eats and drinks.

Aug. 5. Appetite good and appears hearty.

Sept. 2. Killed for further examination.

P. M. Kidney firmly united. Diminished considerably in size. Omentum adherent.

EXPERIMENT 24. Jan. 18. Medium size dog. Weight 17 kilograms. The left ureter was exposed through a lumbar incision and severely compressed with an ordinary hæmostatic forceps in a number of contiguous places.

Given 2 Cc. of Magendie's Sol.

Jan. 19. Up; eats and drinks and appears, if at all, very slightly affected.

Jan. 20. Same. Continued thus till Feb. 10th, when he made his escape.

EXPERIMENT 25. Jan. 18. Medium size dog. Weight 15 kilograms. Left ureter exposed through a lumbar incision and incised for a distance of 6 Cm.

Given 2 Cc. of Magendie's Sol.

Jan. 19. Refuses food and water.

Jan. 20. Same.

Jan. 21. Found dead.

P. M. Adhesions among the intestines and omentum. Here and there were scattered solid flakes of a yellow-purulent substance. Cavity contained 415 Cc. of bloody urine. Death from sepsis.

EXPERIMENT 26. Jan. 18. Small size dog. Weight 14 kilograms. Left ureter exposed and divided about 8 Cm. from the kidney. It was then noticed that the animal was pregnant and apparently near the full time.

Given 2 Cc. of Magendie's Sol.

Jan. 19. Found dead.

P. M. The abdominal cavity contained a large number of blood clots. There was but a small amount of fluid present. The tubes which contained the product of conception were empty.

Death was perhaps hastened by the absorption of the urine and the interference with pregnancy.

(To be continued.)



## A CASE OF CÆCAL HERNIA.

SYMPTOMS OF STRANGULATION; HERNIOTOMY; WOUND OF THE  
BOWEL; SUTURE; RECOVERY.<sup>1</sup>

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CASES of cæcal hernia are sufficiently rare to be of interest, many surgeons having passed through a long course of hospital practice without ever having seen a case of caecal hernia. It is seen more commonly in children and is usually of congenital origin, being covered completely by peritoneum and lying in its own sac. In other cases, especially where the hernia is of the acquired form, it follows a pre-existing enterocele, the sac of which enlarging and growing downwards, tears away the peritoneum from the iliac fossa, and later, if the enlargement continues, partially deprives the cæcum itself of its peritoneal covering at the same time displacing and drawing down a portion of it. Such was the course of events, I imagine, in the case I am about to relate. These cases cannot be readily diagnosed before operation, and to the surgeon they offer great difficulties in operating for the radical cure. They are not easy of reduction and are often of large size.

*Case.* H. H., *aet.* 53, door-porter, was admitted into the wards of the Montreal General Hospital, on April 18, 1891, suffering from strangulated inguinal hernia.

*History.* Has been a soldier. For the last eleven years has had a right inguinal hernia, for which he has from time to time worn a truss. Occasionally the hernia comes down, but he has always been able to return it. Two years ago, whilst lifting

<sup>1</sup>Read before the meeting of the Canadian Medical Association, held in Montreal, September 16, 1891.

a heavy weight, the hernia came down and was reduced with difficulty. A hard lump has remained in the inguinal canal ever since.

Three days ago the hernia came down and he could not return it. He went to his work as usual, but suffered considerable pain. He was constipated, but had no vomiting. The pain increased and the tumor became excessively tender. Constipation was marked and there was great nausea and loss of appetite. He had no severe vomiting. His condition not improving he was sent to the hospital for relief.

On entrance the following notes were made: "A strong, healthy-looking but spare man, *act.* 53, but looks older. Has an expression of great suffering in his face, and complains of nausea and of great pain in right groin. On examination a sausage-shaped swelling is found at the site of the right inguinal canal, which is hard, tense, nodular, dull on percussion, and excessively tender. There is no impulse on coughing.

Below and continuous with this swelling and filling up the scrotum is a much softer tumor, which is neither tense nor tender. The man was immediately placed under ether and gentle taxis was employed, but without avail, so the operation of herniotomy was at once proceeded with.

*Operation.* The parts having been properly cleaned and shaven, an incision was made over the sausage-shaped swelling, and after cutting through the skin a dense, hard mass was met with, which appeared to be composed of fibrous tissue. On extending the incision below this mass the thin, bluish wall of a sac was discovered. This was incised and immediately about two ounces of a straw-colored fluid escaped. No intestine was found in this sac and it was supposed that the gut slipped back as the fluid was evacuated. The sac was now slit up to the upper end, through the thickened fibrous mass, and then an attempt was made to dissect it out. This was found to be a most difficult task, as it was very adherent. The floor of the sac was composed of an irregular cystic mass, with elevated ridges containing large blood-vessels. This mass, on close examination, proved to be omentum which had become incorporated with the posterior wall of the sac. Posteriorly the sac was so intimately blended with the spermatic cord that separation could not be

affected without destroying the vas deferens. So the cord was cut through and the testicle afterwards excised. The veins of the cord were enormously distended and the whole cord was in a state of cystic degeneration, which formed a mass below the hernial sac, causing the second swelling already alluded to. After a time I managed to separate the sac and the structures incorporated with it. The neck, which seemed to be thicker than usual, was freed beyond the internal ring, pulled down and then tied with strong silk. It was now turned up and scissors were used to cut it off. The first cut made from below, much to my surprise, opened into bowel. The ligature was immediately loosened and it was now found that the cut had been made into a collapsed portion of cæcum which was closely attached to the upper part of the posterior wall of the sac. On pulling this down further the appendix was seen. The cut in the bowel was about one and a half inches long and the part of cæcum opened was quite free from fæces. It, however, was well washed and then the cut was closed with a continuous suture of fine silk and a Lembert suture over this again. The omentum was separated from the sac, tied off and returned. The sac itself was ligatured below its attachment to the cæcum and the part in front cut away and then returned within the abdomen with the sutured cæcum. A radical cure was now performed by suturing the conjoined tendon to Poupart's ligament. The wound was sutured with silk-worm gut and a drain placed at the lower end.

The patient's condition was excellent at the end of this prolonged operation, and he had no vomiting afterwards. Next day his temperature and pulse were normal, there was some pain about the wound, but his condition was still excellent. On April 25th, six days after the operation, the wound was dressed, the tube removed and stitches taken out. There was union everywhere by first intention. He went on well, without a bad symptom, and was discharged from the hospital on the 16th of May with a small sinus persisting where the drainage-tube had been. He returned to the hospital on May 22d, saying he felt well and was attending to his work as usual. Had some pain and tenderness about centre of scar. June 5th, returned again, with a small suppurating point at centre of scar, through which

protruded a silk ligature. This proved to be one of the ligatures which united the conjoined tendon to Poupart's ligament. The sinus now quickly healed and the patient has felt well ever since, attending to his duties and suffering no pain. He has never worn a truss. In this case there was no doubt a double hernia, viz., one of the cæcum and one of the small intestines in front of the cæcum. The hernial sac, which contained the small intestines and omentum, had for its posterior wall the layer of peritoneum covering the cæcum, and as it descended it pulled the cæcum down with it. From prolonged use of a truss and inflammatory attacks which had occasionally occurred the sac was thickened and the omentum so fused with it that it really had become part of the sac. Closely incorporated with the posterior wall of the sac was the lower end of the cæcum, which was only covered in front by peritoneum, and as it was empty and the same color as the sac, from having been herniated, probably for some years, it was not recognized or even suspected, until, when cutting off the sac, it was opened. As soon as this occurred the cut bowel was pulled down and then it was recognized as the cæcum, and the character of the hernia was at once apparent. The cut in the bowel was immediately sutured and no harm resulted. The removal of the right testicle was a necessary proceeding, for the cord and sac were so blended that a separation without injury was not possible. In one way the sacrifice of the testicle was a great gain, in that it helped to make the radical cure more certain, an additional plug in the canal being provided by the stump of the cord.

## SUGGESTIONS AS TO THE TECHNIQUE OF INTESTINAL ANASTOMOSIS.<sup>1</sup>

By H. HORACE GRANT, M.D.,

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THERE is no other obstacle to the crowning success of intestinal surgery so trying to surmount as the dealing with wounded, damaged, or diseased gut. That it should remain the opinion of so many of the most experienced and skillful surgeons in the face of all progress to this end, that it is safer to establish a temporary artificial anus than to undertake resection in an emergency, is sufficient evidence of how serious the difficulty is regarded to be. It has been unmistakably established that the safest way to accomplish resection, or to overcome strictural obstruction, without resection, is by intestinal anastomosis. The best methods and means of performing this are, however, not yet sufficiently definite to be declared authoritative. Very much of this surgery is in the mind of the individual who does it, and is not written in any book, or to be learned of any teacher. However, certain essentials of success are definite, and many contributory details are at hand. In making intestinal anastomosis after the present approved plan, the first consideration is the plates. For utility, availability, and convenience, there is no other, as far as my experience goes, to compare with the raw hide, suggested by Robinson of Chicago. A more careful preparation of them than he proposes is desirable, however. A small piece of skin from the leg of a fresh hide should be shaved while still wet, soaked twenty-four hours in a saturated solution

<sup>1</sup> Read before the Mississippi Valley Medical Association, at St. Louis, Oct. 15, 1891.

of salt and water, stretched and dried for several days, cut in desired shape and size, kept for forty-eight hours in oil of juniper-berry, and preserved in absolute alcohol. These plates are now aseptic and will keep indefinitely. The size of the plate to be used is controlled by the size of the bowel somewhat. It is important to make the anastomotic cut long enough. The edges will retract to a sufficient width only if the length permits it. It is not safe to make an oval opening. An incision less than one inch can scarcely be enough in an adult, and ordinarily it should be even longer. I nearly always found the anastomotic opening less than the lumen, and frequently partially clogged up with grass and other indigestible stuff eaten by the animal. It is customary to provide the plates with six threads armed with needles. These needles are greatly in the way. It is far easier to use a slightly curved, round, open-eyed needle, through which the threads can be passed as rapidly as they are picked up, using the same needle successively on each thread as it is needed. The threads of one side and end should be clamped by a forceps to prevent tanglings. If it is intended to make a resection, the question arises about ligating the gut. Unless the gut is greatly distended, this step is unnecessary, and only takes time. It need never be done in experiments on animals, compression by the fingers of an assistant is all that is needed. The part to be excised having been located, a reliable silk ligature is carried by a needle, through the mesentery close to the gut, and tied in two or three inch loops to prevent hemorrhage. It can be done in a minute. There is precious time wasted in cutting away the V shaped redundancy. A basting stitch run through the folds of the loosened mesentery, after a little scratching, if wished, will cause it to adhere and be out of the way after repair. A needle armed with a safe silk thread is entered through the outer layers of the gut, about one-fourth of the circumference from the mesenteric border, and carried through the tissues parallel with that border about a half inch, a loop of thread allowed and the needle reintroduced on the opposite side of the gut even with the point of exit and brought out in the same way.

The gut is then divided with sharp scissors at the point where the ligature entered the mesentery, and traction made on the loop of thread over the cut end greatly facilitates invagination.



One free end of the thread is now passed through the open-eyed needle, and the tucking in of the invaginated end completed, stitched and the other free end tied. The other point to be resected is treated in like manner. This point of management was suggested to me by Dr. Sherrill, of this city, and I have found it of great help. The safe extent of invagination is defined by Dr. Robinson at half inch. As it is as difficult to secure permanent invagination as it is to prevent over-invagination, and as too much time spent in sewing up the divided ends is to jeopardize the patient, a little more extent is no risk. I have not seen, in over fifty experiments, the undoing of an invagination made as suggested, and the firmness of the stitch prevents the progress of the ends in either direction. A slit of the desired length is now made in the lateral border of the gut with a pointed scissors, terminating an inch or more beyond the invaginated stump. Through this slit the plate or ring is readily introduced, this being facilitated by needling the threads successively into place through the intestinal walls. It is not important in this form of resection to determine between the distal and proximal portions of the gut. The stumps may point in the same or opposite directions. While an assistant approximates the plates, the threads are tied. The order of tying is not important, though I prefer to tie those lateral ligatures next the mesentery after the end ligatures are fastened, leaving the upper threads on a clamp to the last. Auxiliary stitches are introduced as needed; these should be of silk. If the gut has been ligated, the ligature is now removed and the parts inspected.

When anastomosis is made after intestinal obstruction, the distension of the gut is usually great. At least the proximal end of the resection may be ligated. A strand of iodoform gauze is passed through a slight puncture in the mesentery a safe distance from the point of division to allow easy introduction of the plate. The severed ends when drawn out of the abdomen can be safely emptied of any contents and sponged clean.

It is always safe to employ as the last step an omental graft.

The severed graft, as described by Dr. Robinson, is always a great additional security. It is quickly torn from the border of the great omentum. Hemorrhage rarely appears. It has not

seemed necessary to follow the suggestion of Senn and Robinson to scarify the peritoneal surfaces to get adhesion. The necessary manipulation of the parts in the operation excites sufficient exudation to answer. The scarification not only takes additional time, but may cause embarrassment by troublesome oozing; however, it is only additional safety.

I have never seen an unscarified graft fail. It is well to tack the graft with fine catgut in two or three places to the gut. The graft should well cover the wounded surfaces. Two or more grafts should be used on wounds wider than two inches.

Unsevered omental grafts are dangerous obstructions to the sovereignty of the fecal circulation, and should only be used, when after a desperate operation, a large graft is needed, and the shock is too great to be added to by further manipulation or delay. I have wound the great omentum, unscarified, around a completed anastomosis and encircled it with a catgut ligature, to find in ten days complete adhesion over the manipulated surface, but the band very threatening to any wandering loops of intestine.

I have not tried the grafts of iodoform gauze, because I am sure I should not feel justified in using so unsafe a material to the risk of human life when there is an ideal means at hand. The iodoform gauze graft, appropriate as it is in some operations, cannot find a place in the one now considered. The final steps in such an operation—whether to use drainage tube, to fix the anastomosis to the abdominal wound and leave the cut partly open, the irrigation of the cavity, the redressing of the wound—must depend on the condition of the patient, the operator's preference, and on questions of general abdominal surgery. Very important details of technique are given in a succinct and masterly manner by Dr. Robinson in his highly valuable little book on "Practical Intestinal Surgery."

It has been the object in this note to call attention to several important steps, managed in my experiments differently from any suggestions I have seen, and with results satisfactory enough to deserve confidence. I am fully alive to the serious responsibility of making statements, the reliability of which may involve the security of human life, and have only offered my conclusions after careful investigation and thought. The steps indicated I have frequently completed in twenty minutes after anæ-

thesia was induced, and under especially favorable circumstances in several minutes less. When the anastomosis is made without resection, the time required is not more than half.

The points I note are :

The plates and their preparation.

The length of the incision in the gut.

The treatment of the mesentery.

The method of accomplishing invagination.

The use of the open-eyed needle.

The probable waste of time in ligating the gut and scarifying.

## EDITORIAL ARTICLES.

### HEIDENHAIN ON THE TREATMENT OF SENILE GANGRENE OF THE LOWER EXTREMITY, PARTICULARLY IN DIABETIC PATIENTS,<sup>1</sup>

The author reports thirty cases of senile and diabetic gangrene from Küster's clinic in Berlin, a larger number than ever has been treated by one surgeon. They occurred between 1871 and 1890. He thinks it proper to consider them together, as the clinical feature is mainly the same, and the course and surgical treatment identical.

That diabetes is apt to be complicated by phlegmonous and gangrenous inflammation, particularly of the lower extremity, was first pointed out by Roser, in 1880, who believed that diabetes, *per se*, produced these inflammations. Koenig and Kraske maintained that they only occurred by infection, and that perhaps diabetic patients offered a more favorable soil for the growth of the bacteria than healthy persons. Although antiseptic treatment was necessary, they considered it just as important to pay proper regard to the constitutional treatment by diet and medicine. Kraske agreed with Roser that operations ought to be avoided as much as possible in diabetic patients, at least till the excretion of sugar was diminished by dietetic treatment.

Israel calls attention to a point of great importance in the etiology of diabetic gangrene, viz., the arterio-sclerosis. He found arterio-sclerosis in thirteen out of twenty cases, particularly in aged persons. Gangrene occurs very rarely in youthful patients with diabetes, although the diabetes is particularly malignant in them, which is another proof that the arterio-sclerosis is the cause. Both diabetes and arterio-sclerosis are apt to be followed by similar surgical affections, and when both are present, their power of evil may probably be

<sup>1</sup> Prof. L. Heidenhain (Greifswald), *Deutsche Med. Wochenschrift*, Sept. 17 1891.

increased. Sonnenburg states that one may find on the extremities of diabetic patients either acute progressive phlegmonous inflammations or a slowly progressing gangrenous spot on a toe, which later form is difficult to diagnose from senile gangrene.

The first form is oftener found in younger, the second in older patients.

Schüller thinks that diabetes increases the disposition to gangrene by producing early arterio-sclerosis and favors the development of inflammatory processes after insignificant lesions by deteriorating changes in the tissues.

All authors agree on the following points:

1. Diabetic tissues possess an increased inclination to inflammation and gangrene.
2. Arterio-sclerosis is frequent in diabetes.
3. Diabetic gangrene occurs frequently in old persons, never in young persons below twenty-five years.
4. Diabetic and senile gangrene are clinically identical.

In regard to the etiology of pure senile gangrene, Koenig states that it occurs in the majority of cases as the result of an inflammatory stasis following a slight injury and secondary to previously existing coldness and numbness of the feet

It is rarely the result of a marastic thrombus in the smaller terminal vessels, still more rarely the result of an embolus or spontaneous thrombosis of a larger artery. In regard to treatment the general rule has been first to operate when the line of demarcation has formed, unless there be danger of life.

Koenig particularly has emphasized this, and shown that even the severest cases may recover by operation, although he in a general way advises against early operations before a line of demarcation has formed.

Hutchinson recommends, on the other hand, to amputate in all cases of senile gangrene in the lower third of the femur. He states that gangrene returns on account of the diseased condition of the arteries, if a lower amputation be made.

The prognosis of diabetic gangrene is generally considered very bad. All Albert's cases died. Mayer mentions eleven cases, all am-

putated, of which six died, and the gangrene returned in the rest. Of sixty-one not operated cases forty-nine died, viz., eighty per cent.

The thirty cases of primary amputations in Küster's clinic between 1871 and 1890 occurred in twenty-five patients, three patients having double amputations performed, and one patient triple amputations. Eleven patients had diabetes, two of which had double amputations performed, and fourteen patients pure arterio-sclerosis. Of these one had a double and one a triple amputation performed.

Küster performed besides these thirty primary amputations ten secondary amputations on account of recurrent gangrene shortly after the amputations. Küster commenced with low amputations but was always obliged to reamputate higher up, on account of recurrent gangrene of the wound, and was in that way, little by little, forced to amputate in or above the knee-joint in every case of gangrene of the lower extremity, in which the gangrene extended to the dorsum or planta of the foot.

Thirteen primary amputations were performed below the knee, including exarticulations as Chopart's & Lisfranc's. Of these, only two amputations healed, two died of gangrene of the flaps, and nine were reamputated in or above the knee.

One exarticulation at the knee-joint healed by first intention, another, a reamputation for recurrent gangrene after amputation further below, terminated again in gangrene, but recovered by amputation of the femur.

Amputation of the femur through the condyles was done nine times—eight primary and one secondary.

Two died of diabetic coma, one recovered by first intention, six after marginal gangrene of the flaps, which, in two cases, necessitated reamputation. Amputation of the femur above the condyles was performed thirteen times—six being primary and seven secondary.

Of the six primary amputations four died (one patient, seventy-eight years old, of hypostatic pneumonia, another, eighty years old, of heart failure, one case of diabetic coma, and another, a diabetic, of debility in fifty-eight days), and two recovered, one of which had marginal gangrene, another, after reamputation in the middle of the femur on account of total gangrene of the flaps. Of the seven



secondary amputations above the condyles, two healed by first intention, three after moderate and two after severe flap gangrene. In three femur amputations the point of amputation is not mentioned. One healed by first intention, two died, with aseptic wounds, of uremia and diabetic coma.

To *recapitulate*, of seventeen primary amputations at and above the knee, two healed by first intention, three after moderate marginal flap gangrene, one after severe flap gangrene, three after reamputations, and eight died of diabetic coma and heart complications.

Of ten secondary amputations at and above the knee, three healed by first intention, six after marginal gangrene, one after reamputation and none died.

Of the eleven diabetic patients, five died, four of coma and one of heart complications.

Of the fourteen patients with pure arterio-sclerosis, nine recovered and five died—two of gangrene (a Lisfranc and a crus-amputation), one of heart complications, one of hypostatic pneumonia, and one of myocarditis and nephritis.

All patients who were amputated at or above the knee recovered, if they did not suffer from diabetes and albuminuria or from heart troubles, two cases of death following gangrene excepted, which were amputated before the antiseptic period.

In later years every amputated limb has been examined and, as a rule, an old thrombus was found, occluding either the femoral artery or the anterior or posterior tibial arteries, and explaining the cause of the recurrent gangrene after low amputations. The thrombus was most frequently found in the popliteal artery.

Arterio-sclerosis and atheroma were found twenty times in the twenty-five patients, and old thrombi, perfectly occluding the large vessels, eleven times. In thirteen not diabetic patients atheroma was found present, seven times with thrombi. In the diabetic patients atheroma was noted seven times with four thrombi.

The systematic examination of amputated legs has only been done during the last few years and it is probable that a thrombus is present in the large arteries in senile gangrene, both of diabetes and not diabetic origin in more than fifty per cent.

H. MYNTER.

## INDEX OF SURGICAL PROGRESS.

### GENITO-URINARY ORGANS.

**I. On the Relative Value of Perineal and Suprapubic Lithotomy.** By DR. WILHELM T. LINDENBAUM (Jaroslavl, Russia). In the course of the last nine years the author has made 70 perineal lithotomies in children under 15 years of age, with 2 deaths; and 32 in adults, with 8 deaths. Besides, during 1890 he performed 10 suprapubic lithotomies in patients aged from 8 to 52 years, with 1 death (the fatal case referred to, a man of 52, with pulmonary tuberculosis and fatty heart). The high operation was conducted after the following rule: 1. All instruments were sterilized; 2. Colpeurynter was introduced into the rectum; 3. The bladder was filled up with 250 Cub. Cm. of a salicylic solution; 4. Drainage was inserted (no vesical sutures being employed); 5. The patient was kept on his abdomen for from 8 to 10 first days; 6. The dressing was changed once daily. The urine began to flow through the urethra, on an average, on the 20th day, the wound soundly healing on the 30th. As far as young children are concerned, suturing the bladder is thought to be very difficult, and, on the other hand, quite superfluous, since a healthy urine does not irritate the wound. The author's general corollaries are as follows: 1. Perineal lithotomy in early childhood represents a safe operation and gives excellent results. A relatively enormous percentage of deaths in old age can be explained by the coexistence of grave complications about viscera (especially kidneys). 2. Suprapubic lithotomy does not offer any important advantages over the perineal operation. The mortality remains yet very high, even in children. 3. Still, speaking generally, in the presence of stones, measuring above 2 Cm. in diameter, the high section should be preferred, but in cases of smaller calculi perineal lithotomy should be performed.—*Meditsinskoïe Obozrenië*, No. 2, 1891, p. 133.

**II. Litholapaxy in Children.** By DR. LEONTY P. ALEXANDROFF (Moscow, Russia). The author, house surgeon to St. Olga's Hospital for Children, communicates 32 cases of Bigelow's litholapaxy, performed by him in patients aged from 1 to 14 years. Five cases ended in death, in three of them the issue being directly due to the operation (to rupture of the urethra, with extensive hemorrhagic infiltrations of the adjacent tissues, and consecutive phlegmon of the penis, and pyæmia), while of the other two one died on the 6th day from supervening double pneumonia, and one from peritonitis, developing secondarily to a sub-diaphragmatic abscess (in connection with an old empyema fistula). The remaining 27 children survived, recovery ensuing in from 2 to 17 days (on an average in 6). The size of the stone was in 4 cases under 1 Cm.; in 12, from 1 to 2; in 8, 2 Cm.; and 3, 2.5. The operation was conducted under chloroform, the calculus being crushed by means of Colin's lithotrite, No. 00 (corresponding to No. 14 French), and detritus removed by means of Clover's evacuating apparatus (with a boracic acid solution). The author's general conclusion may be given as follows: 1. Litholapaxy can be successfully practised not only in adults, but also in children. 2. An urethra, freely admitting an instrument, No. 14 French, or No. 7 English, should be regarded as the limit for a safe performance of the operation. 3. Stones measuring above 2.5 centimetres in their smallest diameter can be safely crushed only in such boys whose urethra freely admits larger instruments than those mentioned above; otherwise the issue of litholapaxy will be doubtful. 4. The operation should be always performed by means of a fenestrated lithotrite. 5. In the absence of the said conditions, suprapubic lithotomy with suturing the bladder should be resorted to, the operation giving excellent results in children.<sup>1</sup>—*Vratch*, No. 3, 1891, p. 86.

**III. Litholapaxy in Children.** By Dr. T. J. POPOFF (Moscow, Russia). The author reports four cases of litholapaxy successfully made by Prof. V. I. Küzmin in children, aged from 2 to 4. In each case the patient's urethra was subjected to a preliminary

<sup>1</sup> *Vide* the author's paper on the subject in *Annals of Surgery*, November, 1889, p. 377.

gradual dilatation by means of bougies (from No. 13 up to No. 20). In none any disagreeable complications occurred. To study the distensibility of infantile urethra, the author carried out experiments on 20 dead bodies of children under one year of age. In two infants, 10 days old, he succeeded to pass Nos. 9 and 11, respectively; in two, aged 20 days, No. 11; in two, aged 25 days, No. 13; in an infant of 27 days, No. 14 could be introduced. On the whole, the author has arrived at the conclusion that the infantile urethra is very distensible, the limits being No. 14 for children of 1 month; No. 16 for those of 1 year, and No. 18 for those of 2 years. The chief obstacle for passing lithotrites is said to lie in the narrowness of the prostatic part of the urethra (which statement is decidedly opposed by Dr. A. L. Ebermann, who, while performing median lithotomy in young children, could easily pass into the bladder his rather thick forefinger. Prof. F. I. Sinitzyn's experience is fully in accord with Dr. Ebermann's).—*Meditsinskoïž Obozreniē*, No. 2, 1891, p. 132.

**IV. Sarcoma of Male Bladder.** By Dr. PAVEL T. SKLI-FOSOVSKY (Moscow, Russia). The author relates a very interesting case, referring to an apothecary, aged twenty-eight, who had been suffering from recurrent gonorrhoea since his sixteenth year, the last attack (in 1889) having persisted three months, notwithstanding a thoroughgoing treatment. In January, 1890, shortly after the patient had taken  $1\frac{1}{2}$  bottlefuls of red wine, there suddenly appeared hæmaturia, which, however, could be controlled by some hæmostatic drug. In February, after an examination by means of bougies, the hemorrhage recurred, while about the middle of March there supervened truly formidable erections on micturition and defecation, the patient's penis becoming as large as a good-sized bottle. On each occasion the erections lasted for from two to five minutes, the gentleman suffering from excruciating pain (loudly crying, tearing his hair, throwing himself down, etc.). The agony could be somewhat mitigated only by his lying on his back and applying ice to the penis and perineum. In the course of time the micturition steadily grew even more frequent, while the quantity of urine voided as steadily decreased. Ultimately, about the middle of July, catheterisation became necessary. When

seen in September, the gentleman was exceedingly emaciated, anæmic and irritable, complaining of incessant vesical tenesmus and pain, anorexia sleeplessness and prostration. On digital examination *per rectum*, there was discovered some induration above the prostate, on the posterior vesical wall, while sounding the bladder gave entirely negative results. The urine proved to be of an acid reaction and to contain abundant pus corpuscles and vesical epithelium cells, scanty red blood corpuscles, some mucus, diplococci and streptococci. On September 17th an exploratory suprapubic cystotomy was performed by Prof. N. V. Sklifosovsky, the bladder being found to be filled up with a soft, friable and easily bleeding new growth of the size of an adult man's fist. It was attached to the anterior and left lateral walls of the organ, reaching down almost to the vesical orifice of the urethra. The removal (partly with scissors, partly by means of a lithoturic scoop) was most tedious, the tumor breaking up and profusely bleeding on dissection. After the extraction, the edges of the vesical wound were fixed with two silk sutures to the skin (through the abdominal wall), and a drainage tube inserted into the viscus. The operation lasted 1½ hours. The erections gradually ceased, defecation became painless, and the patient's general condition considerably improved. In November, however, there formed a perineal abscess, followed by nausea, vomiting, right-sided facial paralysis, and aphasia. In December (3½ months after the operation, or a twelve-month after the first symptoms) the patient died from intercurrent pleuropneumonia. The vesical tumor (examined microscopically by Prof. I. Th. Klein) proved to be a round celled alveolar sarcoma growing out from the submucous coat.—*Letopis Khirürgitsheskaho Obstitchestva v' Moskvë*, No. 3, 1891, p. 195.

**V. Fibropapilloma of Male Bladder.** By DR. LUDWIG M. BUIKO (Astrakhan, Russia). The author communicates a case of a somewhat anæmic, but otherwise generally healthy and strongly-made male pauper, aged sixty-five, who was admitted on account of hæmaturia, exceedingly frequent and painful micturition, insomnia and anorexia. The hemorrhage had first appeared about fifteen years previously to his admission. In the beginning it had been recurring

at irregular and long intervals, but of late it had become almost continuous and profuse, the discharge frequently consisting of blood alone. Examination of the bladder, after all possible ordinary methods having failed to discover anything abnormal, Thompson's exploratory perineal urethrotomy, with dilatation of the vesical neck, was performed. A very large, soft, profusely bleeding, pedunculated papillary tumor was found, its broad and very dense pedicle being attached to the left postero-lateral wall of the organ near the trigonum. The new growth could be removed only piecemeal, the pedicle being scraped out. After arresting bleeding by hot water injections, a drainage tube was introduced, and the wound plugged with iodoform gauze. On the twenty-first day after the operation the wound soundly healed; on the forty-second the man was discharged in best state possible. The tumor closely resembled a huge acuminate condyloma. Under the microscope it proved to consist of highly vascularized connective tissue with bundles of non-striated muscle fibre (especially near the pedicle), the villi being lined with flat epithelium arranged in many layers. According to the author, international literature contains 101 cases of operations for vesical tumors. Of the number, in 51 *Thompson's perineal urethrotomy* was made (8 cases of cancer, 5 sarcoma, 27 papilloma, 6 of tumor of "intermediary type"), with 22 deaths (7 cases of cancer, 2 sarcoma, 7 papilloma, 3 "intermediary"). Of the 22 lethal cases, in 6 death ensued within 5 days after the operations, while in 16 the patients died, either from some accidental cause or from recurrence of the disease at a more or less remote date. In 18 cases (5 of cancer, 1 sarcoma, 4 papilloma, 1 cyst, 1 myxoma, 3 of an unknown type), *suprapubic cystotomy* was performed, with 10 deaths (4 cases of cancer, 1 sarcoma, 1 papilloma, 1 myxoma, 3 "unknown type"), of which 4 were caused by the operation itself. In 9 cases *median perineal cystotomy* was resorted to with 5 deaths; in 5 *lateral perineal section*, with 2 deaths; in 3 *perineal section combined with suprapubic cystotomy*, 1 death; in 5 *perineal section*, after unknown method with 1 death; and in 4 the tumor was extracted by means of catheterisation and washing out, all the patients recovering. Reviewing the subject, Dr. Buiko comes to the conclusion that: 1. Speaking generally,



Thompson's operation affords the best surgical treatment in cases of vesical tumors; 2. As Vvedensky (*Khirurgitsvesky Vestnik*, May and June, 1886, and Nov. and Dec. 1887) and Mariashes (*ibid.* Nov. and Dec. 1886) justly insist high cystotomy should be resorted to solely in such cases: *a.* where a double exploration elicits the presence of a diffuse tumor; and *b.* where Thompson's exploratory operation reveals the presence of a new growth situated either about the vesicle apex, or on a lateral wall of the viscus.—*Vratch*, No. 23, 1891, p. 551.

**VI. On the Treatment of Hydrocele by Injection of Iodine Tincture.** By Dr. SERGHEI M. DOBROKHOTOFF (Moscow, Russia). The author's paper represents a careful digest of 119 cases from Prof. F. I. Sinitzyn's hospital (83) and private (36) practice, the patients' ages varying from 10 to 60 years. Prof. Sinitzyn invariably operates in the following manner: The patient, being slightly brought under the influence of chloroform, a compress is placed on the inguinal region and fixed by a roller (in order to prevent any penetration of iodine into the peritoneal cavity), after which the tumor is tapped and as much as possible of the fluid removed (in order to prevent the formation of clots, which considerably lower the effectiveness of the drug). Afterwards four grammes of a concentrated iodine tincture are injected, and the testicle subjected to a gentle rubbing (to secure a thorough contact between the diseased membranes and the tincture). The fluid is then allowed to flow back, after which other four grammes of the tincture are introduced, a certain quantity of the liquid being this time left in the cavity. [The preparation used is iodine tincture, *Ph. Russ.* (1 part of iodine to 10 parts of a 95 per cent. alcohol), previously kept in an open vial for several days.] No reaction whatever is observed until the middle of the following day when there appear some malaise, slight chill, and a mild rise of the temperature ( $38^{\circ}$  or  $38.5^{\circ}$  C.), while the scrotum becomes swollen and congested. The symptoms gradually increase until the end of the third, or, occasionally, fourth day, after which they begin to as gradually subside. The patient's stay in the hospital after the operation varies between 7 and 23 days, lasting mostly from 8 to 12 (while in cases treated by incision the sojourn oscillates

between 22 and 32 days. The latter method is resorted to by Prof. Sinitzyn only in such cases where the tumor is non-translucent, be this due to thickening of the cavity walls, or to intra-vaginal blood effusions). In none of the 119 cases any untoward complications occurred. Of the total, 118 patients were cured, and only in one case the operation failed to attain its object (adhesive inflammation), incision being ultimately (on the seventeenth day after tapping) performed. No recidives yet occurred in any of the patients (in some of the cases six years have elapsed since the operation.) Analysing his materials, Dr. Dobrokhotoff comes to the conclusion that in an overwhelming majority of cases of hydrocele the iodine injection affords the simplest, surest and safest means for obtaining a radical cure, the method being especially convenient and indicated in country practice. [The paper has been read at the Fourth General Meeting of the Russian Medical Association. In the course of a discussion, Dr. S. L. Ebermann, of St. Petersburg, stated that he similarly obtained best results from the radical method in question. It is, however, contraindicated in cases of *a.* considerable thickening of the tunica vaginalis; *b.* opacity of the dropsical contents; and *c.* enormous enlargement. In cases of the latter category a great distension of the membrane may interfere with the development of an effective adhesive inflammation (*Meditsinskoiž Obozreniž*, No. 2, 1891, p. 138). Professor V. I. Küzmin, of Moscow, has declared that he decidedly prefers tapping, followed by irrigation of the cavity with a 3 or 4 per cent. carbolic acid solution. While similarly securing a radical cure the carbolic injection does not induce vaginal adhesions, leaving the testicle in its normal biological conditions. Moreover, the method is painless, while the iodine injections are exceedingly painful. In the presence of large tumors Volkmann's operation is necessary. (*Vratch*, No. 4, 1891, p. 118.) Dr. I. Spijarnyi, of Moscow, has drawn attention that Prof. Stüdensky, of Kazan, observed recidives even after using a 50 per cent. carbolic solution (*Med. Obot.*, *l. cit.*). Dr. A. A. Troianoff, of St. Petersburg, has said that he is highly satisfied with the results from the injection of a 1 per mille corrosive sublimate solution which, while causing no pain whatever, invariably brings about a permanent obliteration of the vaginal cavity. Al

cases of thickening he treats with incision (*ibid.*). Prof. A. D. Parlovsky, of Kiev, has thought that another contraindication for the injection methods, and an indication for incision, is constituted by tubercular lesions of the tunica vaginalis (*ib.*) *Rep.] Meditsinskoje Obozreniē*, No. 3, 1891, p. 279.

VALERIUS IDELSON (Berne.)

**VII. Cancer of the Testicle in Child.** By Drs. SABRAZES and FROMAGET (Bordeaux, France). A young child, two and a half years of age, presented a round and regular tumor of the left testicle of about the size of a small orange. It was heavy, tense, opaque and but little sensitive to pressure. The scrotum, which was covered with a network of veins, was free from adhesions, and the spermatic cord seemed normal. No enlarged glands could be detected, either in the groins or pelvis. Castration was performed, and a solid and voluminous tumor removed, involving the whole testicle, except the epididymis. Three ligatures were applied to the spermatic cord, which the tumor had implicated, the scrotum was stitched up, drained and dressed antiseptically. Recovery took place without complication, except a slight cedematous induration of the scrotum and concomitant rise in temperature immediately following the operation. The tumor, on microscopical examination, was found to be an epithelial cancer. The writer emphasizes the rarity of tumors of the testicle in children. Ch. Monod reported in the *Progrès Medical*, 1884, twenty-six cases of malignant tumor of the testicles in children, of which in the majority of cases the growth was either sarcoma or carcinoma; in two the tumor in question was a true enchondroma. To these may be added a case described by M. Piechand in his *Lecons Cliniques*, Bordeaux, 1889. The prognosis of these neoplasms is so grave that M. Monod thinks these patients condemned to certain death in six months to a year.—*Journal de Médecine de Bordeaux*, No. 20, 1890.

F. H. PRITCHARD, (Boston).

**VIII. Perineal Section.** J. W. WHITE, M. D. (Philadelphia). The author insists upon the retention of the term "perineal section" rather than that of "external urethrotomy" for cases in which the operative procedure is instituted for conditions of acute

retention, from whatever cause, and in which no instrument can be made to reach the bladder, the urethra being simply opened behind, the point of obstruction for palliative purposes.

In commenting upon those of the cases reported in connection with the paper in which the operation was done for rupture of the urethra, the author states that, in his experience, the history of the case offers but little of value in determining the seat of the laceration; this may be better estimated by the character and limitation of the extravasation. To facilitate the study of these cases in their relation to the extravasation, he divides the urethra into four regions: first, from the meatus to the scrotal curve; second, between the attachment of the scrotum and the anterior part of the bulb; third, the bulbous urethra; fourth, the membranous and prostatic urethra. In the first named the extravasation is accompanied by swelling and discoloration of the penis. In the second, the course of the extravasation is governed by the attachments of the deep layer of the superficial fascia. In the third, the extravasation will follow first the space enclosed by the last named fascia in front and below, being limited posteriorly by the anterior layer of the triangular ligament. It must of necessity therefore be directed into the scrotal tissues, finding its way thence between the pubic rami and symphysis until it reaches the abdomen. Should the membranous urethra be alone involved, the extravasation would be limited between the layers of the triangular ligament, and would not invade other parts until after suppuration and sloughing had taken place. Should, however, the portion of the urethra behind the triangular ligament (prostatic urethra) give way, the extravasated urine may either find its way, first, along the rectum to the anal region, and second, by perforating the thin pelvic fascia near the pubo-prostatic ligament, spread rapidly through the subperitoneal connective tissue.

The author insists upon the immediate performance of the operation in all cases of retention of urine from recent rupture of the urethra where catheterization is impossible. In cases in which the symptoms of rupture (blood at the meatus and difficult urination) are present, but no apparent extravasation, and in which catheterization is easy, he recommends regular evacuation of the bladder with a soft

instrument and watching for the onset of pronounced symptoms (fever, local swelling, etc.). In those cases in which positive symptoms of extravasation are present, yet the introduction of a catheter is possible, although difficult, the advice to permit the latter to remain in situ, and at the same time to open up freely all suspicious swellings about the perineum and scrotum, is given.

In cases in which it is found impossible to identify the proximal end of the urethra after the perineal section, retrograde catheterization through a supra-pubic opening is recommended.

In discussing the question of permanent catheterization after perineal section, the author believes, by avoiding introducing the instrument too far into the bladder, and observing strict cleanliness by regular antiseptic irrigations, this course will be found to possess many advantages.

The experiences of many surgeons, including his own, leads W. to favor the employment of sutures in closing the rent in the urethra. This, conjoined with the retention of a full-sized catheter, it is claimed, meets all of the indications.

In the after-treatment boric acid and salol, administered internally for the purpose of sterilizing the urine, and full doses of quinine, are recommended.

The instruments and operation of Wheelhouse in cases in which perineal section is performed for impassable stricture, are given the preference over all others. W., however, omits that portion of the Wheelhouse operation which relates to the turning of the concavity of the staff so as to hook the latter into the upper portion of the urethral wound, observing that in this position it must be held by an assistant, is sometimes in the way and does not afford much help during the operation.—*Am. Jour. Med. Sci.*, Jan., 1891.

GEO. RYERSON FOWLER (Brooklyn).

## ABSCESES—TUMORS.

**I. On the Treatment of Psoas Abscesses by Means of Injections of Iodoform.** By DR. JOHANN P. BITSCH (Copenhagen). The writer, after treating several cases of Psoas abscess by means of iodoform suspended in glycerine, arrives at the following conclusions:

1. This method of treatment should be tried in every case of Psoas abscess. If the result be unfavorable there will still remain an opportunity to employ operative procedures, while the prognosis is not unfavorably influenced by this treatment.

2. The treatment by injection has the advantage of being a slight operation, without danger and requiring no special skill. Anæsthesia is only exceptionally necessary as the procedure is not painful. Any physician will have the necessary instruments. It may be employed in patients who are up and about, and promises a greater degree of success than any other method, and, lastly, causes no disfigurement.

3. As to its disadvantages they are only slight. Iodoform poisoning may occur, yet this may be avoided by not injecting too large quantities of the fluid holding the iodoform. If it should happen, one may be assured that it will be easily overcome; no fatal case has been observed.

4. On the contrary, it may take much time before the abscess is entirely healed, even one half year. But this disadvantage is overbalanced by the fact that the patient can be up and attend to his business during the whole time of treatment, except one or two days after each injection. Then he should rest in bed.

5. This method is adapted to the treatment of every cold, tuberculous abscess, whether it be of osteopathic, glandular or idiopathic origin. It is especially useful in small abscesses following osteitis, where it is astonishingly efficacious.

6. Finally, it has been successfully used in all other tuberculous affections where local treatment is possible, especially in osseous and articular tuberculosis.

The writer used this method with excellent results in a case of tuberculous coxitis in which resection was thought indicated.—*Hospitals Tidende*, No. 49, 1890.

ALBERT PICK (Boston).



**II. Echinococcus of Pelvic Bones.** By DR. ADOLF H. ZANDER (Perm, Russia). The writer relates the following singular case: A formerly always healthy and strong peasant, aged 50, was admitted to the local Zemsky Hospital on account of left-sided lameness (which had first appeared, without any visible cause, about 3 years previously), agonizing pain about the limb, and swelling of the extremity and corresponding buttock, the latter symptom being of a week's standing or so. On examination, the limb was found to be drawn up, the buttock fluctuating, and the temperature slightly febrile. Suppurative coxitis was diagnosed, and Hueter's resection resorted to. The muscular layer being divided, a huge mass of disintegrated tissues with abundant pus escaped, exposing a large-sized sub-periosteal cavity and a severely worm-eaten external surface of the pelvic bone. The cavity was found to communicate with another one, freely admitting several fingers and extending in the thickness of the iliac bone from the pubes to the sacrum, its walls being as thin as a paper sheet and here and there perforated. The cavities were filled up with *débris* and numberless sequestra. On washing out the parts after the operation, there escaped a great number of hydatid cysts of varying size (up to that of a walnut). For a while the patient did well, but since the 10th day he began to complain of violent backache and increasing weakness, and on the 21st he died from septicæmia. Numberless echinococci continued to escape from the wound up to his death. On the autopsy the left sacro-iliac joint was found destroyed; the sacral bone, through its whole thickness, was stuffed with enormous numbers of small-sized bladders, while in the left iliac fossa, between the muscular layer and bone there was present another cavity, containing cysts and communicating with the intra-osseous cavities mentioned above. The femur's head was carious, but did not contain any parasites.—*Khîrürgitchesky Vestnik*, December, 1890, p. 770.

#### BONES.—JOINTS.—ORTHOPÆDIC.

**I. On Operative Treatment of Tuberculosis of Hip and Knee Joints in Children.** By DR. LEONTY P. ALEXANDROFF (Moscow, Russia.)—The author, House-Surgeon to St. Olga's Hospital for Children, communicates 77 cases operated upon by him during the

last 4 years. Of the total, 43 cases were of tubercular *hip joint disease*, 18 patients being under 5 years of age, and 25 aged from 5 to 11. Three patients died, the fatal issue being due invariably to a quite accidental cause (one succumbed to amyloid degeneration of the liver and spleen, with ascites and albuminuria; another died from dysentery, and the third from whooping-cough, complicated with pneumonia). Of the remaining 40 cases, in 32 a complete recovery followed; in 5, minute fistules were still persisting (at the time of the communication), though manifesting a distinct tendency to healing, while in 3 large permanent fistulas formed. In 34 cases, the *knee-joint* was affected, 14 patients being under and 20 above 5 years of age. In 20 cases, Volkmann's operation was performed; in 3, Textor's; and in 9, Koenig's. Of the 34, 3 died (2 from tuberculosis, one from severe measles); 28 made a complete recovery; and in 3, minute fistules remained, with tendency to closing. The following are the essential conclusions reached by the author: 1. In cases of tuberculosis of large joints in children, the most rational treatment is that by operation, the method giving 90 per cent. of complete recoveries. 2. The treatment is absolutely safe—provided, of course, all due precautions are adopted. 3. A consecutive development of miliary tuberculosis occurs only in exceptional cases. It can be also observed after non-bloody operations. 4. The most important advantage of operative treatment consists in a rapid recovery, which ensues usually within the first two months. Moreover, it enables the patient to leave his bed at a comparatively early date. 5. The best operation in children is constituted by arthrectomy, limited to removing the diseased structures alone. 6. In hip-joint disease, resection of the femur's head is to be made in order to reach deep-seated lesions of the acetabulum. 7. An important condition for securing good results from operative interference is constituted by obtaining a rapid first intention of the whole wound. 8. Drainage and numerous ligatures markedly interfere with a total first intention and promote the development of articular fistules. 9. In such cases, where the wound heals *per primam*, the patient may be allowed to get up and walk, with a due support, even in 3 or 4 weeks after the operation. 10. The best supporting appliance is

afforded by crutches, which should be used for about a twelvemonth. The employment of various supporting apparatuses is injurious, since they lead to a considerable wasting of muscles and bones. 11. Muscular massage may be useful at any stage, but passive movements of an operated joint should be practiced with the utmost caution, and always under the guidance of an experienced surgeon. 12. In such cases, where a prolonged after-treatment by massage is found to be impracticable, a firm ankylosis should be preferred to a mobile joint, since the former affords a better steadiness of the limb. 13. In little children, the operation of the knee-joint leaves a fairly considerable angular curvature of the extremity, which is due to the impossibility of retaining the latter in a duly extended position, the circumstance being dependent upon a short length of the infantile limb, as well as on a relative abundance of sub-cutaneous fat.—(a) *Proceedings of the Fourth General Meeting of Russian Medical Men, at Moscow, 1891*, No. 2, p. 33. (b) *Vratch*, No. 3, 1891, p. 84; and (c) *Meditzinskiĕ Obozreniĕ*, No. 2, 1891, p. 130.

VALERIUS IDELSON (Berne).

**III. The Limitations of Rest and the Employment of Exercise in the Treatment of Fractures.** By DR. SMIGRODSKI (St. Petersburg). Basing his observations upon the experience gained during the past 5 years in the Peter and Paul Hospital, in St. Petersburg, Dr. S. makes the following observations: It goes without saying that the circular plaster-of-Paris bandage had taken possession of the field in the treatment of fractures, although v. Dumreicher has combatted this notion upon more than one occasion. The ideal treatment of fractures seemed to a great many to have been reached, however, inasmuch as that which before was but illy provided for by cumbersome splints, namely, absolute rest of the parts, was accomplished with the greatest ease, apparently, by means of the plaster-of-Paris bandage. The well-known Russian surgeon, Dombrowski, however, realizing that the great advantages which plaster-of-Paris undoubtedly possesses, led to its employment to a greater extent, and in localities where its value was, to say the least, problematical, as for instance, in fracture of the thigh, turned his attention to other methods of treatment in

this as well as in other fractures, with the result of advancing our knowledge very materially upon the subject of the employment of fixed apparatus in this class of injuries.

Rest, in the recumbent position, is as a rule, insisted upon too rigidly and for a greater period of time than the exigencies of the case really require. The routine method of compelling the patient to remain for a certain length of time in the recumbent position has obtained to too great an extent in modern surgery, and Dombrowski, following Lucas Championnière, insists that this is of no advantage, and indeed may be of positive disadvantage to the patient. Even so far back as 1833 Bérard announced that an ambulatory treatment of fractures gave the best results. Following this, in 1834, Baron Larry's retentive apparatus, based upon a method in use by the Egyptians, afforded all the advantages of exercise, by the aid of crutches, according to Seutin, with none of the disadvantages heretofore incident to the treatment of this class of patients. In England and France the ambulatory treatment of fractures seems to have been extensively employed, while in Germany (and America) there has been but slight attention paid to the method.

The aim to be reached, in following out this method, is to have the patient leave the recumbent position at as early a day as possible, and to encourage him in the use of crutches as soon as practicable. Each individual case is to be treated upon its own merits, in this particular, always bearing in mind this object. Different methods of fixation of the fragments are employed, the most frequent, however, consisting of a cotton wadding and moulded tin and pasteboard apparatus, which is found to be more convenient and lighter, as well as less liable to be injured by movements than the plaster-of-Paris bandage. The Thomas splint, in some fractures, may be found a useful addition to the plaster-of-Paris, or tin and pasteboard splint, above referred to. Of course, during the first few days following the injury, while reaction and fever are in progress, the patient must be kept in the recumbent position, with the limb elevated, the toes must be freely moved when the bandages are firmly set. In from 5 to 10 days, when, as a rule, all pain has subsided, he is compelled to abandon this, and, with the aid of Thomas' hip-splint, to move about as much as his strength and the

facility with which he can use his crutches will permit of. After from 7 to 10 days longer, the bandage is removed and passive movements of neighboring joints, with massage of the soft parts in the neighborhood of the fracture, employed. The latter is not always necessary.

An important fact brought out in the experience of Smigrodski relates to the differences between the two sexes as regards the period of time necessary for the repair of a fracture. It was found that, as a rule, at least one and a half times as long a time was required in women as compared to men, to accomplish the same result. This is attributed to the fact that it was found impossible, in the case of the former, to induce or enforce an early resort to exercise, whereby a portion at least of the advantages gained by this portion of the treatment was lost. In no case was vicious or superfluous callus, pseudoarthrosis or atrophy of the injured limb observed. In 2 cases it was shown that too much exercise was disadvantageous, inasmuch as thereby the union was retarded.

The experience with Bardenhauer's extension method was not productive of good results. In comparing the collection of cases reported upon by Smigrodski with those heretofore tabulated, it is found that the statistics are altogether in favor of Dombrowski's method as advanced by Smigrodski. The differences in the period of time during which the patients remained under observation at the hospital is not so striking, however. The principal difference seems to relate to the proportion of this time which the patient spends in bed, but one-fifth part of his entire stay in the hospital being spent in bed.—*Centblatt f. Chirg.*, 1891, No. 8., p. 161.

GEO. RYERSON FOWLER, (Brooklyn).

#### GYNÆCOLOGICAL.

**I. Laparotomy for Uterine Hydatids.** By A. A. ALTORMYAN, M. D. (Aleppo, Syria). A woman æt. 35, married at 15 and a mother at 22, after a second marriage at 30, noticed a swelling in the left iliac region, about the size of a small orange, with no effect upon menstruation. Upon examination four years afterwards, a tumor was found, the size of a head, with apparently fluid contents, freely

movable and perfectly dull on percussion. During the ensuing three months it doubled in size, became painful, lost its mobility, and assumed a more central position. Abdominal section revealed a tumor with easily separable adhesions to the parietes; the trocar obtained a light straw-colored fluid. The pedicle was found to originate in the substance of the uterus, the thick, investing capsule of the tumor protruding from the fundus of the uterus, just above the attachment of the left Fallopian tube. It was treated extra-peritoneally after ligation with an elastic ligature. Within the capsule was found the ectocyst, a thick, laminated homogeneous membrane, displaying a peculiar tremulous motion; within this was a thinner delicate membrane, the endocyst, within which were found about a dozen walnut and filbert-sized cysts, with a few granular particles. There was no fever and the patient made a rapid recovery.—*London Lancet*, April 4, 1891.

JAMES E. PILCHER (U. S. Army).

**II. Acquired Crural Hernia of the Ovary; Operation; Cure.** By DR. G. PACINOTTI (Camerino, Italy). The writer reports the following case: L. S., a housewife, 40 years of age, and married, had always been well, except an intestinal crural hernia, which some five years before became incarcerated and was successfully operated on. She returned home, wearing, as a precaution, a truss. A year after the operation she noticed that another hernia had formed in the opposite groin. Although this was quite troublesome, she did not consult a physician. One day, after a violent sneeze, the tumor suddenly increased in size, became more consistent and painful on pressure, while she found that she could not reduce it as she did before. Still, she had no symptoms of incarceration as she had had with the hernia of the other side. The tumor increased in size and became more painful during the menstrual periods. Finally, the hernia becoming more troublesome, she only obtaining relief during menstruation by lying on her back with her thigh flexed upon the pelvis, she entered the hospital. On examination a swelling of the size of a pigeon's egg was discovered in the middle of the base of Scarpa's triangle. It was covered with normal integument, gave, on



pressure, a feeling of unequal consistency, toward above it seemed pediculated, was resistant and painful on pressure. The pain did not radiate to the abdomen, but, rather, to the uterine region. The uterus was found in anteversion and drawn towards the side on which the hernia was situated. There were no enlarged glands to be discovered. A longitudinal incision was made through the hernial sac and the ovary was discovered as a hard and fibrously-degenerated body, occluding the opening of the sac. Several small cysts of the fimbriæ of the Fallopian tube were removed, the adhesions of the Fallopian tube broken up and the ovary returned into the pelvic cavity. The hernial sac was then removed entire and the neck of the sac stitched as highly up as possible. Four sutures were placed through the crural ring and the skin sutured over the whole with silk. Union took place by first intention.—*Lo Sperimentale*, No. 11, 1890.

ALBERT PICK (Boston).

**III. A Colossal Fibro-Cystoma of the Ovary.** By Dr. PETERS. The patient, a woman, æt. 40, whose last delivery was 20 year before, and who in the course of 5 years had aborted twice, noticed for 13 years a slow increase in the circumference of her abdomen. Disturbances of defecation and urination had appeared 2 years since. The patient's appetite was variable, she having at times morbid cravings.

During the last year she suffered from pains in the back, swelling of the legs, sleeplessness and loss of appetite. The largest circumference of her belly, somewhat below the navel, was 145.5 cm.; between the xiphoid cartilage and the pubes the distance was 81 cm. The operation necessitated an incision 60 cm. long. The removed tumor consisted of the left ovary. It was a fibro-cystoma, 38-50 cm. in diameter (in different places) and weighed 37 kilogrammes (about 81 pounds). Recovery took place without any disturbance. The patient is obliged to support the superfluous abdominal skin by a binder.—*Oeekb. van het Node. Tsjdsch. voor Geneesk.* 1890, I No. 2.

F. H. PRITCHARD (Boston).

**IV. A Modified Hysterorrhaphy.** By DR VATON. In a review of Vaton's work, *Etude comparative des differents traitements du prolapsus uteri*" by Luke, of Königsberg the following description of the former's modification of Caneva's method of fixing the displaced uterus to the anterior abdominal wall is given: The abdominal wall is incised in the median line until the peritoneum is reached. The latter is now loosened from the posterior wall of the previously distended bladder with the right index finger, the left hand keeping back the coils of intestine. According to Vaton, whose trials of the method were made upon the cadaver, this can be accomplished without difficulty. The peritoneum is now easily loosened from the anterior surface of the uterus; the bladder is now emptied. The uterus is now fixed either by sutures or Muzeux's forceps, drawn toward the abdominal wall, and, both sides of its anterior wall are secured, as a preliminary step, to the anterior surface of the peritoneum. A thread is then led through the abdominal muscles of the left side, which grasping the anterior surface of the uterus, passes out through the right side of the abdominal wall. A similar fixation suture is established about 1 cm, below the first. The sutures are now firmly tied and the abdominal wound closed.—*Centbl. f. Chirg.*, 1890, No. 42

(It can be truly urged in favor of this operation that the dangers of opening the peritoneum are avoided. On the other hand, it is questionable whether the peritoneum could be as easily slipped from the bladder and uterine wall in women the subject of diseased conditions of the generative apparatus, as was found to be the case in the cadaver upon which the experiments were made. In the hands of those surgeons, however, whose faith and practice do not carry them well within the aura of aseptic and antiseptic belief, the method offers a comparatively safe and justifiable means of affording relief to an otherwise helpless class of individuals.—G. R. F.).

**V. The Indications for Total Extirpation of the Uterus through the Vagina.** By DR. SCHAVTA. The author records 65 cases, operated upon by himself, of which but 5 resulted unfavorably. The best results were reached by the extra peritoneal fixation

of the entire pedicle and complete closure of the peritoneal cavity and supra-vaginal wound space. The cases operated upon for carcinoma show an immunity from recurrence for the space of two years, to the extent of 47.3 per cent. of the entire number. The indications may be briefly summarized as follows: "1. For uterine carcinoma, all cases, whether of body or cervix, should be submitted to this procedure at once. The occurrence of infiltration of neighboring parts need not necessarily serve as a contra-indication, the operator being only guided by the extent of this. In any event, healthy tissue must be reached, if the operation is undertaken. The surface of the vagina, for instance, may be invaded, while its deeper structure may have escaped. Anæsthesia and curetting are especially recommended as aids to diagnosis. Carcinomatous infiltrations are rigid, non-elastic and diffused; inflammatory exudates are yielding, elastic and more distinctly circumscribed. 2. Under certain circumstances the operation may be performed for prolapsus uteri, where other measures of relief have failed, and in which the pelvic floor has undergone marked atrophy, as well as in cases in which the prolapsus is complicated with myoma, or becomes irreducible from any cause. In addition to this, cases of uterine myomata complicated by pain and hemorrhage, and in which the uterus body is not developed beyond the size of a fist; cases of large myomata, after enucleation of the same by means of laparotomy; and finally, for recurrent glandular endometritis in which there is a suspicious tendency to malignant degeneration of the endometrium. 3. Contra-indications to the performance of the operation, in addition to those mentioned above, relate to absolute narrowing of the pelvis, in cases where the uterus cannot be reached from below nor drawn down. In cases of narrow or cicatricially stenosed vagina, the latter may be incised laterally in its entire length and sufficient room thereby obtained.—*Münch. Med. Wochenshr.*, 1890, No. 33.

**IV. Upon the Treatment of the Pedicle in Hysterec-tomy by the Elastic Ligature.** By DR. RICHELOT (Paris).—R. depends exclusively upon the elastic ligature in myomectomy. He employs a soft rubber catheter for the purpose of ligating the stump.

He claims, by this means, to avoid including any portion of the bladder in the effort to secure the stump, which occurs through the existence of adhesions between the lower uterine segment and the bladder. After removal of the uterus the uterine mucous membrane, which may remain in the stump, is touched with the thermo cautery. The application of iodoform to the stump is considered by R. unnecessary.

The final fate of the sunken rubber ligature differs; in many cases it is encapsuled, while in others it is extruded through the os-uteri.

R's cases include sixteen cases, in which three deaths occurred. Of the thirteen successful cases, three were not treated by means of the sunken elastic ligature (two extra peritoneal, one intra peritoneal). Both of the extra peritoneal cases were complicated with febrile conditions following the operation. The ten subsequent cases were treated by means of the buried elastic ligature, and went on to recovery without accident. Of the three cases which proved fatal, and in which the elastic ligature was employed, one died in the third week from exhaustion, one died on the fifth day following the operation from intestinal obstruction (ileus) and the third perished from congestion of the lungs.

As especial advantages in favor of the elastic ligature the author points to the favorable course of the stump, the certainty which this method offers against after hemorrhage, infection, etc.—*Annal de Gynéc.*, 1890, T. xxxiv., p. 287.

#### ABDOMEN.

**I. Iliac Colotomy in Two Stages.** By DR. PAUL RECLUS (Paris). Lumbar colotomy in France is now almost completely abandoned in favor of the operation in the iliac region. For those cases in which the urgency of the symptoms do not demand immediate interference with the intestinal contents, the operation as performed in two stages is recommended. The procedure of Maydl is the one preferred. Cocaine anæsthesia is employed, and the operation in com-

pleted in from six to ten minutes. The bowel is opened four to five days after the operation—*Bul. et Mém. de la Soc. Chir. de Paris*, T. xvi, p. 104.

GEO. RYERSON FOWLER (Brooklyn).

**II. A Case of Preternatural Anus; Enterectomy, Enterorhaphy; Followed by Immediate Recovery.** By PROF. ANGELO MAZZUCHELLI (Pavia, Italy). The patient was a boy, æt 8. The preternatural anus presented itself after operation on a gangrenous loop of intestine belonging to an incarcerated inguinal hernia. The spur which separated the two intestinal ends was destroyed by means of an elastic ligature, which was left in situ for eight days. After the lapse of this period it was attempted to close the fistula, but the edges would not unite. The author, subsequently, performed in this case enterectomy and enterorhaphy. About three centimeters were resected from each end of the intestines toward the convexity of the spur, in such a manner as to decrease towards the mesentery. Then the sutures after Czerny's method were applied. The intestines were then replaced into the abdominal cavity, the parietal peritoneum, as well as the abdomino-scrotal wound closed. The wound healed by first intention and the patient recovered quickly.—Meeting of Medico-Chirurgical Society, of Pavia; *Gazzetta degli Ospitali*, No. 89, p. 708, 1890.

ALBERT PICK (Boston).

## REVIEWS OF BOOKS.

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A PRACTICAL TREATISE ON THE DISEASES OF WOMEN. By T. GAILLARD THOMAS. Sixth edition, enlarged and thoroughly revised by Paul F. Munde. Philadelphia: Lea Brothers & Co. 1891.

A new edition of Thomas's work on Diseases of Women is an important event in gynecological literature, not only in America, but in the world at large. Having been translated into German, French, Italian and Spanish, this work has probably exercised a greater influence on gynecological practice throughout the civilized world than any other single book, perhaps, with the exception of "Sims's Notes on Uterine Surgery."

Eleven years have elapsed since the publication of the last edition, and during that short time the yet young science and art of gynecology have made such enormous strides that a new edition has been looked forward to with eager curiosity and great expectations. But, in the meantime, the practical work of the celebrated author had acquired such proportions that it was absolutely impossible for him to find time to rewrite the book, and, on the other hand, science and practice had changed to such an extent, and so many new works had been published on the subject, that the publication of a simple reprint of the last edition was out of question.

Under these circumstances, Dr. Thomas might have followed the example of other busy authors and engaged some unknown assistant to bring the text up to date. Instead of that he placed the work in the hands of a man who enjoys himself a world-wide reputation as an author; a man who possesses great personal experience in gynecology; a man thoroughly familiar with American and foreign gynecological literature. By associating with himself Paul F. Munde, Dr. Thomas has rendered his book and the public the greatest possible service; and it is hard to say who is most to be congratulated, the younger



man who had the rare honor of being chosen to write a new edition of so celebrated a work, or the older man who secured the services of such a collaborator.

Dr. Munde was empowered to change, omit, or add wherever he saw fit, without reference to Dr. Thomas's views or experience. Individual experiences or differing opinions have been included in brackets and signed T. G. T., or P. F. M. New chapters have been added, such as those on "Electricity," "Hermaphroditism," "Diseases of the Urethra and Bladder," and the "Diseases of the Female Breast." The new edition is slightly enlarged and has 347 engravings against 266 in the last edition. Many of the new figures have a particularly pleasant soft tone, probably due to new methods in the art of engraving. Examined with a magnifying-glass, the surface is seen to be covered with small black spots, separated by white spaces, that intersect one another at right angles.

This edition remaining as a historical monument of the part each collaborator has taken in the revision, it might be preferable in a following to do away with the bracket system, by which the book would get a more uniform appearance. When the authors deem it desirable to publish their personal experience on divergent views, it might be done simply by mentioning the name of the one or the other of the two authors without changing the current of the text. Both authors living in the same city, they can easily come to an understanding about the meaning of certain expressions used by one of them, so that it would become unnecessary for one to make hypotheses in regard to the views of the other, as on p. 491, in speaking of evacuation in peritonitis, or, on p. 808, about Thomas's incision at the circumference of the breast for removal of mammary tumors.

In general, the two authors agree, and one being fourteen years younger than the other, this joint edition acquires an importance which even a new one, written by the original author alone, could not have. In an age in which the comparative innocuousness of abdominal surgery has lead to such a *furor operandi* as displayed by many gynecologists, the highly-conservative spirit that pervades the present work is especially valuable, since it contains the views of two men of

large experience, with unquestioned skill, with every facility for carrying out their plans, and of whom one is considerably younger than the other, and has probably had more opportunity of seeing what is being done in those places where bold progress has got ahead of wise conservatism.

The spirit of conservatism pervades the whole work. Thus the authors feel somewhat inclined to limit ventrofixation of the retroflexed uterus to cases where the diseased ovaries and tubes form the chief indication for the operation.

In speaking of inversion of the uterus, they say the rule should be positively and unhesitatingly accepted that gentle, slow and safe methods should always take precedence over rapid, harsh and dangerous ones.

In their opinion, inflammation of the pelvic cellular tissue, with its resultant consequences of dislocation of the uterus, pelvic abscess, and cicatricial induration occurs independently by itself, as well as from inflammation of the Fallopian tubes, ovary or adjacent peritoneum, with resultant purulent accumulation in these organs.

The danger of a pelvic abscess bursting into the peritoneal cavity is not great, and as experience goes to prove that the knife is often employed too early rather than too late, they strongly recommend to delay surgical interference until the presence of pus is an absolute certainty. Should the abscess be deeply seated, so as to make the operation difficult and uncertain, it would expose the patient to hazards greater than those attendant upon delay.

Thomas recommends aspiration, and has recourse to incision only if the fluid re-accumulates. Munde uses the aspirator for diagnostic purposes only. When pus appears he thrusts in a pair of closed sharp-pointed scissors, opens them, introduces an expanding dilator, scrapes the cavity with the finger or a blunt curette, washes out with bichloride of mercury solution (1:10,000), leaves a drainage-tube in the abscess, and packs the vagina loosely with iodoform gauze. The abscess is irrigated several times daily with a tepid 2 per cent. carbolyzed solution.

Munde advises to open extra-peritoneal hematocele from the vagina, if it is to be opened at all. As he lays much stress on the

necessity of following the opposite rule, perform laparotomy and tie the bleeding vessel, in intra-peritoneal hematocele, it would be good to point out the signs by which at least sometimes the differentiation between the two kinds of hematocele may be made.

In the chapter on fibroid tumors the authors say that only a very small proportion of such cases which have come under their personal observation have been thought by them to justify the operation of laparotomy.

In treating of oöphorectomy they say that while the majority of women recover after it, this operation must not be considered as either entirely safe or a trifling one, since some do die, and in any case the removal of organs of such vital importance to a woman as are the ovaries should be well considered before it is practiced. Only in the very last emergency would they consent to the removal of ovaries which are diseased in no other way than as the result of chronic inflammation.

In cases of fibro-cystic tumors of the uterus, where the attachments are so extensive or the vascularity so great as to render their complete removal too hazardous, they think it far preferable to open the cyst by a large incision, evacuate the fluid, remove redundant tissue of the sac-walls, stitch the sac to the abdominal wound, and pack it with iodoform gauze, than to remove the tumor at all hazards.

They have found that pyosalpinx can be successfully treated by incision from the vagina and drainage, and they warn against "the indiscriminate, hasty, and routine performance of removal of diseased appendages."

In the chapter on extra-uterine pregnancy, strong evidence is adduced in favor of the treatment by electricity up to the end of the fourth month. Laparotomy is only recommended when the sac has ruptured, and later after the death of the child, if there is trouble.

On page 68 we notice the defense of the vaginal tampon against Tait's fierce attack.

Since the use of tupulo is so warmly recommended it would be good to say how it can be disinfected.

Emmet's new operation for lacerated perineum does not find favor with the authors, which perhaps explains that so meagre a de-

scription is given of it, and that it is illustrated by a figure which can hardly fail to mislead those who have not seen the operation as Dr. Emmet performs it.

The word *para-uterine* cellulitis being a hybrid, might, to advantage, be replaced by the pure Greek and commonly used parametric.

The question about the superiority of supra-vaginal amputation or total amputation in cases of cancer of the cervix, is left undecided.

Both authors, especially Munde, are rather against the use of drainage tubes, while Miculicz's method of using iodoform gauze, both for hemostasis and drainage is highly recommended.

They are so convinced that opium is not only unnecessary, but injurious, after abdominal section, that they only administer it when no other means, especially an ice bag, can control the pain.

They move the bowels within twenty-four to forty-eight hours after laparotomy.

Should the temperature rise above 100° F. and tympanitis appear, the speedy administration of laxatives is preferred.

Irremovable ovarian cysts are cut open, stitched to the abdominal wound edges, and packed with iodoform gauze, which is changed every four or five days until the cavity is filled by granulation.

With these few remarks we must conclude our brief review, happy if we have impressed the reader with the worth and excellence of the work. In our days in which gynecology, after having been developed to a high degree of perfection at the hands of specialists, to a great extent has returned to the domain of the general surgeon, no surgeon can afford not to make himself acquainted with a book which in a comprehensive form gives a true idea of gynecology in its present shape, and is based on the observation, the experience and the collaboration of two so able men as Thomas and Munde.

H. J. GARRIGUES.

A TREATISE ON PRACTICAL ANATOMY, FOR STUDENTS OF ANATOMY AND SURGERY. By HENRY C. BOENNING, M.D. F. A. Davis, Philadelphia, Publisher.

This is an octavo volume of 450 pages, printed in pica and illustrated with 178 wood-cuts. It contains about one-half the

matter of "Holden's Manual," and one-fifth of that of "Gray's Anatomy." The title under which it is introduced is misleading. The term "practical anatomy" has come to mean the study of the subject by dissections, and works bearing that title are supposed to be arranged with special reference to guiding the student in exposing anatomical structures upon the cadaver. No book pursuing the classification made use of in works on descriptive anatomy, no matter how complete, can be used successfully in the dissecting room, without presuming, on the part of the dissector, a considerable knowledge of anatomical relations.

The work under consideration not only follows the usual classification, considering the various structures of the body independently of each other, but neglects all mention of relations. In this respect, then, the author utterly fails to fulfill his claim of having arranged his subject "so as to make it equally serviceable as a text-book on anatomy and a *dissector*."

Of the 450 pages, 150 are devoted to osteology, 20 to arthrology, 60 to myology, 35 to angiology, 65 to neurology, 75 to splanchnology, 25 to the special senses and about 20 to "regional anatomy."

The description of the brain and spinal-cord occupies considerably over half the space allotted to the whole nervous system. Ten pages are consumed in describing the teeth, being just double the space given to the description of the kidneys.

As much space, namely, 20 pages, is devoted to the anatomy of the eye and ear as is given to the surgical anatomy of the neck, axilla, perineum, Scarp, as triangle and femoral and inguinal hernia combined. It is not to be supposed, from the above figures, that any book can be reviewed upon a purely mathematical basis, but it is desired to call attention to the fact that so much space is given to the consideration of subjects of little practical interest, and so little to those of the utmost importance to the student intending to fit himself to practice the art of surgery.

The skeleton is fully discussed, and considerable space is given to the anatomy of the nerve centres; but the articles on the muscles, the arteries and the distribution of the nerve trunks are scarcely more than

compendiums, necessitating the use of some more exhaustive work to supply the needed information.

Although, in his preface, the author anticipated and denies the charge, the book seems to be but a compilation, and in some respects merely a somewhat elaborated index to such knowledge as the student should acquire.

Taken as a text-book it possesses very noticable defects, using in the special description of parts terms such as "anastomosis," "synovial membrane," and the like, of which no previous definitions have been given, besides making statements with little care for scientific exactness.

When physiological chemists disagree among themselves, as to whether the relative proportion of the organic and inorganic constituents of bone vary at all at different periods of life, this author should not state that "an analysis of the bones of the growing skeleton show that they have a much higher percentage of organic matter and less of earthy than the skeleton of a vigorous adult, while, in old age, the organic matter is decidedly decreased and the inorganic or mineral matter correspondingly increased," without, at least, mentioning the authority upon which the assertion is made. For describing the capillaries, as he does, as the smallest radicals of the arterial system, there can be no possible excuse.

The following is an extract from the preface: "It will be found fully abreast of the latest teachings in anatomy, and, in some directions, decidedly aggressive, as in treating of the outer layer of the muscular fibres of the uterus, and of the structure of the alveolar processes of the maxillary bones."

The aggressive teaching in these respects is confined to two simple statements: one that the superficial layer of the muscular fibres of the uterus constitute an erectile plane, disposing the organ in a position favorable to fecundation; and the other, that the alveolar processes are temporary structures, little developed prior to the eruption of the teeth, and disappearing entirely in edentulous subjects.

It scarcely seems necessary to have added another book to the volumes of literature upon anatomy for the sake of stating these propositions, which, indeed, are rather in the line of philosophical research.

WM. W. BROWNING.



## REGIONAL ANATOMY IN ITS RELATION TO MEDICINE AND SURGERY.

By GEORGE MCCLELLAN, M.D. In 2 volumes, 4to. J. B. Lippincott Co., Philadelphia, Publishers.

This work, published in two volumes, is to be sold exclusively by subscription. The price, complete, will be \$15 in cloth and \$17 in half Russia. It consists of a collection of photographs of dissection, colored by hand and reproduced by lithography. These are bound with the accompanying text in quarto size. The print is plain and open, upon heavy paper, and surrounded by a margin such as is denied to smaller pages. In the first volume, which is before us, there are 53 plates, illustrating the dissection of the head, neck, thorax and upper extremity. No region has been neglected and every step in the dissection is fully illustrated.

Anatomy is the corner-stone of the temple of medical science, and familiarity with the structure of the human body is necessary to the successful practice of the arts of medicine and surgery.

The dissecting-room has long been considered the only place where anatomical study could be practically pursued. Unfortunately, however, the difficulty in obtaining material when desired, the time demanded and the skill required to properly expose the structures and preserve their relations, as well as the objections which are urged to the physician passing between the dissecting-room and the sick chamber, have tended to neglect on the part of the practitioner of this important branch of knowledge.

To obviate this, art has been resorted to, and attempts have been made by the pen, the brush, and latterly the camera, to display what has been discovered by the knife. Drawings, while useful in assisting one to locate the various structures upon the subject, exaggerate details, as a rule, to such a degree, as to confound the student and mislead the more experienced dissector. On the other hand, the camera, though absolutely truthful in its general effects, from its power to reveal comparative light and shade only, fails to sufficiently define the details of a dissection.

The author of this work sails between Scylla and Charybdis by photographing his dissection and bringing the details into relief by a

judicious application of the brush. The dissections are well selected and the coloring remarkably correct, as any one must admit who is at all familiar with appearances in the dissecting-room.

These illustrations cannot but prove of great assistance to the student engaged in practical work upon the cadaver, but will be especially appreciated by those to whom this privilege is for any reason denied. The author has met a want long felt by the profession, enabling one to place upon his library shelves, ready for constant reference, a collection of most beautiful dissections, so that anatomical relations may be examined, without submitting to any of the annoying, dangerous or disgusting features of the dissecting-room. Each plate is accompanied by a full description, so as to render unnecessary reference to the accompanying text.

The text, independently of the plates, is a complete 490-page treatise upon the anatomy of the same regions. The style is adapted in its simplicity, to the mind of the student, and yet the descriptions are sufficiently thorough to satisfy the practical surgeon. The language is scientific, yet free from pedantry. Above all, it is not merely a rehearsal of facts which have been already presented, but displays upon every page an originality which convinces the reader that the author is speaking of what he has himself verified, and his statements are made with an assurance which commands attention and invites investigation. As an instance of his loyalty to correct description may be cited his abandonment of the name "*decendens noni*," and the substitution for it of "*decendens Hypoglossi*," a nomenclature consistent with the adoption of the late classification of the cranial nerves.

Particular attention has been given to topographical anatomy and the relation of external markings to underlying structures—a great desideratum, when it is remembered that the surgeon must deal with the living and not the dead.

Those who have not had time to train their minds to think in metric measurements will be gratified to know that although the French system is adopted, the English equivalent is, in every instance, appended.

It will be impossible, in the scope of this article, to quote more of the author than is sufficient to give the reader a general idea of the nature of his work, and with this purpose in view the following references are made :

In speaking of the sterno-cleido-mastoid muscle he describes its fibres as so disposed as to act upon the occipito-atloid joint either as a flexor or extensor of the head, and we believe careful observation will confirm the statement.

In describing the attachment of the pericardium to the diaphragm and deep cervical fascia, he advances the very plausible theory that "the arch of the aorta is thus maintained, admitting of sudden changes of position without interference with the circulation of the blood at its outset from the heart."

While not trespassing upon the fields of practical medicine or surgery, the work abounds in valuable suggestions founded upon the author's observation of anatomical relations, which are well worth careful attention.

The physical diagnostician may profit by critically examining the following statement: "From careful observations made upon both the living and the dead body, at different ages, it would seem to the author that only when healthy do the lungs meet in front over the root of the heart upon a prolonged and full inspiration. There is generally some interspace between them in the anterior mediastinum. The right lung comes forward more readily than does the left, even in moderate inspiration, so that the anterior edge of the right lung approaches more nearly the middle line. The lower portion of the right lung also expands more readily below in relation to the diaphragm than does the lower portion of the left lung, whereas the converse appears to be true with regard to their apices."

The practical surgeon will admit the reasonableness of the following recommendation: "Repeated examinations of the relation of the fissures (of the brain) to carefully mapped-out points after removal of a disc of bone on the heads of many cadavers, have shown the author the fallacy of depending solely upon measurements, and the importance of making the artificial opening in the skull large enough to enable the operator to see the parts exposed.

The following remarks, in connection with the description of the operation for tying the subclavian artery in its third part, will be read with interest: "The deep fascia can be opened by following the external jugular vein as it pierces it. Much time is often lost through mistaking the cellular space above the deep fascia for that below it. In the depths of the latter the artery in question is situated. In more than one instance the lower cord of the brachial plexus has been mistaken for the artery, and on several occasions tied; but this is not likely to happen if, before securing the ligature, the arm is raised and rotated so as to relax the parts, when they can be better recognized. The impression conveyed to the finger by pressing over the first rib should never be relied on. The operator does not usually see the vein. It is out of the way; below the clavicle. In the deeper cellular space there is generally a quantity of fat, with some lymphatic glands, which, when enlarged, offer additional embarrassment to the operator."

Altogether, the work will prove a valuable addition to the literature of anatomical science. When the expense which must have attended its publication is considered, the price of the book is not excessive, yet it is to be regretted that it is sufficiently high to prevent it from reaching the mass of the profession.

WM. W. BROWNING

ESSENTIALS OF NERVOUS DISEASES AND INSANITY. By JOHN C. SHAW, M.D., of Brooklyn, N. Y. 48 illustrations, pp. 194, cloth, \$1.00. Philadelphia, 1892, W. B. Saunders.

This small volume of Dr. Shaw's merits more attention than is usually given to such compends. Since the appearance of Webber's work there has been no short comprehensive American book on this subject. Some rather unique features are noticeable. The attempt to cover both Insanity and Nervous Diseases in so short a space compels abridged treatment of each, and yet an over-concise style is successfully avoided. The number and value of the illustrations, largely original, is another novelty, that, however, adds greatly to the instructiveness of the text. At least a brief mention is made of many of the more recently described nervous disorders, and a useful Anglo-

American bibliography added to each section. A kindly recognition is accorded the contributions of his fellow-countrymen.

The limited size has compelled the omission of certain important topics. Some emendations will doubtless be made in future editions. Treatment is also discussed too briefly to suit most Americans, even students. From a reviewer's standpoint, such a work is not to be estimated by its size, but by the accuracy and relevancy of the facts presented, and this test it stands unusually well for a first edition.

The ample experience of the author, first as Superintendent of a large asylum and later in the outside practice of his specialty, is happily evident all through.

WILLIAM BROWNING.

ON THE SURGICAL MANAGEMENT OF GENITO-  
URINARY CALCULUS.<sup>1</sup>

By JOSEPH D. BRYANT, M.D., LEWIS A. STIMSON,  
M.D., EDWARD L. KEYES, M.D., AND  
L. BOLTON BANGS, M.D.,  
OF NEW YORK.

A. STONE IN THE KIDNEY.

I. *Diagnosis ; Indications for Surgical Treatment.* By JOSEPH  
D. BRYANT, M. D. SURGEON TO BELLEVUE AND ST. VINCENT'S  
HOSPITALS

THE diagnosis of stone in the kidney implies the consideration of its signs and symptoms, which terms will be employed synonymously by me to-day. The term "stone" is construed to mean a concretion that has a more pronounced individuality than sand, gravel, etc. Stone in the kidney may be either of primary or secondary formation. Primary deposits depend more for their existence upon the inherent or acquired tendencies of the patients than on the accidental influences of their everyday environment. Secondary deposits happen as a sequence of pre-existing stone and also as a consequent complication of pyelitis, cancer, and other structural diseases of the kidney. It follows, therefore, that the history of the symptoms of stone in the kidney will be modified somewhat by the morbid state of the kidney at the time of the stone's inception; that is to say, the symptoms referable only to stone will precede,

<sup>1</sup> A discussion held at the meeting of the New York State Medical Society, Feb. 3, 1892.



rather than follow, the symptoms characteristic of the diseases of the kidney associated with stone development. The existence of stone in the kidney is often exceedingly difficult to diagnose, as the following examples will show :

A stone may develop, pass from the kidney to the bladder, and escape through the urethra without causing any disagreeable manifestations; provided, of course, that it be small as compared with the channels through which it passes. A stone of large size may be found in the kidney after death, without it having caused symptoms even suggestive of its pre-existence. And, too, the difficulty of diagnosis is emphasized in no uncertain manner by the fact that it not infrequently happens that operative procedures fail to disclose the presence of stone in the kidney, even when convincing symptoms point with seeming certainty to its existence there.

It is an established fact that the symptoms of stone in the kidney depend much more upon the size, situation, roughness and mobility of the stone for their presence and prominence than on the fact of the mere existence of this unwelcome tenant in the kidney. The presence of a smooth or immovable stone, irrespective of its size, is less pronounced than that of a small movable rough one. A rough or movable stone, irrespective of size, commonly asserts its presence by causing pain and pronounced modifications in the character and flow of the urine. A small rough stone immovably fixed in the kidney structure, may cause persistent and annoying direct and reflex pains, even though the concretion be so small as to escape the best directed methods of manual and operative technic. A movable or immovable stone, with pronounced asperities, located in the central cavity of the kidney, will cause much severe general and reflex pain, and will also quickly cause changes in the appearance of the urine, dependent on the presence of pus, muco-pus, blood, etc. Small movable stones, whether smooth or rough, will frequently block the flow of urine from the kidney. If small enough, they pass from the kidney sinus with much pain and difficulty through the ureter into the bladder; if too large to thus pass, they either block the ureter temporarily or permanently, or they return to the kidney sinus.

The suggestive symptoms of stone in the kidney, together with the convincing ones, constitute a rational order of arrangement which, it seems to me, will lead most surely to a correct diagnosis. A "suggestive" symptom of stone in the kidney may be defined to be a symptom, the presence of which leads the physician to *suggest* the possible existence of stone; a "convincing" symptom of the same condition causes him to assert its probable existence and to advise some surgical procedure to establish its actual presence.

When the solid constituents, which are usually found in solution in the urine, become excessive, and for this reason are deposited in a crystalline form and thus pass from the body, we are then in a presence suggestive of the possibility of stone formation, especially if at the same time there be found tangible evidence of pus, muco-pus, blood or other plastic elements in the same specimen. The more decided and continuous are these manifestations, the more significant they become; and soon attacks of renal pain, varying in intensity and character signal the occurrence of a tangible union of the organic with the inorganic constituents in the formation of stone in the kidney of greater or less size. Aching lumbar pain, vesical irritability, wandering pains in the loins, urethra, upper part of the thigh, and of the testicle; retraction, attended with hyperæsthesia of the latter; each of these suggest the existence of stone in the kidney, especially if associated with the general evidences of chronic indigestion, nervous prostration, or those of a lithæmic state.

Now, indeed, with such a history, we are well nigh convinced of the probable existence of stone in the kidney. However, the chain of suggestive evidence thus forged may melt away, with or without treatment, leaving us free to expect final cure, or to dread the existence of an ambushed foe.

Whether a stone has formed at all, or whether it continue to increase in size, depends on the mutual affinity of the saline and colloid constituents of the urine for each other. Unfortunately, however, for the prospects of arrest of development or of cure at this time, many of the suggestive symptoms already mentioned imply changes in the kidney structure which are themselves conducive of stone formation. True it is, that inorganic elements of the urine may be present in an excessive

amount, indefinitely, and yet be unattended with stone formation. It is true likewise that the organic elements may exist in similar proportions, with no unfavorable result; moreover, it is strangely true that both of these may be present coincidentally in the urine in large amounts and still no union ensues, until finally, for some unknown reason, their hasty and firm incorporation with each other lays the foundation for stone in the kidney. The step from the "suggestive" to the "convincing" symptoms of stone in the kidney is scarcely appreciable it glides from the first to the second class as one passes from youth to manhood—imperceptibly. Exaggeration of the suggestive symptoms with their addenda comprise the convincing ones. Renal colic with its symptomatic phenomena may now be frequent, prolonged and severe; lumbar pain, markedly increased by jolting movements of the body, and perhaps by turning in bed, is more or less constant; the presence of pus and blood in the urine, and the increase or appearance of the latter with unusual body movements is very common, indeed. Renal epithelium, with or without blood-casts, is frequently found; deep pressure at the seat of the kidney causes pain and tenderness, and perhaps discloses the presence of kidney enlargement the fecal pressure of constipation and fecal movements along the contiguous colon, cause pain of a hyper-sensitive or distended kidney. Finally vesical lavage, and the use of the cystoscope, will establish the fact that the abnormal urinary products are foreign to the bladder, and, perhaps they may be seen to enter that viscus through the ureters themselves. Stone may be present in one kidney alone or in both at the same time; the latter is the more frequent condition. It should not be forgotten that the presence of stone in one kidney may occasion reflex pain in its healthy associate, thus causing the surgeon to suspect that both organs be diseased, or perhaps the latter alone. There are other symptoms of a more or less isolated character that are attributable to stone in the kidney, but, unless they are supported by the presence of one or more of the convincing symptoms already mentioned they can rarely be given the weight to warrant active surgical interference. The symptomatic picture already drawn is essentially practical, discussion being sufficiently comprehensive, as it seems to me, for the purposes of this reading. The indications

for operative surgical treatment are quite clearly implied by the forcible deductions that can be drawn, after consideration of the "convincing" symptoms of stone in the kidney already stated:

(1) Operative explorative treatment should be advised when the group of "suggestive" symptoms are persistent and annoying and are not mitigated by simpler methods of treatment.

(2) Operative surgical treatment should be urged promptly when the group of "convincing" symptoms indicate pathological kidney changes of irreparable nature, especially if the use of simpler means of cure be attended by no improvement.

## II. *The Surgical Treatment.* By LEWIS A. STIMSON, M. D.

SURGEON TO THE NEW YORK HOSPITAL.

The operative treatment of stone in the kidney is so recent an addition to the duties and resources of the surgeon that the experience necessary fully to determine the relative merits of various details and procedures, and even, perhaps, of the fundamental methods of operation has not yet been accumulated. Moreover, the complexity of the subject, created by the widely varying pathological conditions, is correspondingly great, and as the limitations of time imposed by the crowded condition of the order of exercises must be respected, it has seemed to me that the obligations of the duty that has been allotted to me could best be met by (1) a rapid review of the indications for treatment in the different conditions of the kidney, and (2) by a detailed description of the methods and procedures by which such indications are to be carried out, grouping them and comparing them from the operative, instead of the pathological, standpoint.

Stone may exist in the comparatively healthy kidney in the form of gravel, or of one or more masses too large to be passed through the ureter or imprisoned in a pouch of the cortex; or it may have been present as a well-defined stone for a sufficient length of time to have induced suppuration of the pelvis and of the substance of the kidney; or it may be present as an incident, an epiphenomenon, in the course of a pyelo-nephritis.

In the first case, that of a healthy kidney with stone present as gravel or in large masses, the indication is to remove the stone

either through the natural passages, if that is possible, or by nephrotomy, including in this term incision of the pelvis and incision of the substance of the kidney. Possibly this statement of an alternative is not warranted; it may be that there is no operative means to promote the evacuation of gravel or small stones through the ureter. I have made the statement on the strength of a single case, reported by Le Dentu, in which, after recognizing the presence of gravel by acupuncture, and failing to reach it by incision of the substance of the kidney, he noted the escape through the urethra of several concretions and the complete cessation of the previous severe lumbar pain. It may well be that this was a coincidence, in that the relief was such as has been obtained in a number of cases of nephralgia simulating calculus by simple exposure of the kidney with or without exploratory puncture or division of its capsule.

In the second class of cases, those in which more or less extensive suppuration has been set up by the presence of the stone, the indications are more complex: the stone should be removed; that is clear; but is that all, or shall the kidney also be removed? Shall it be a nephrotomy or a nephrectomy? The answer to this question must be found in the degree of disorganization of the kidney. If there is simply a pyelitis, the removal of the stone alone is indicated; for, with the removal of the cause, the cure of the suppurative process may be expected. If the substance of the kidney has become involved, if several non-communicating abscesses have formed in it, doubt will be felt whether drainage sufficient to permit the cure of the abscesses can be established or whether enough of the gland tissue remains to make it worth while to preserve the organ. The importance of preserving any portion of the gland that may still be functionally competent is so great, in view of the possible future disability of its fellow, that the rule of practice should be, I think, to retain the kidney in the absence of a clear, affirmative reason for its removal. Experience has already made it clear that a secondary nephrectomy, that is, one following a nephrotomy, after an interval of a few weeks or months, is quite as easily executed as a primary nephrectomy, and has a much lower rate of mortality. The greater ease of removal is explained by the reduction in the size

of the kidney effected by the nephrotomy and drainage; the lower rate of mortality may perhaps be dependent upon the same cause, or it may be an associated result of undetermined conditions, which led to the execution of a secondary instead of a primary nephrectomy.

In the third class of cases, those in which the stone or stones have formed in consequence of a pre-existing pyelonephritis, their presence can affect the choice of operation only in case the main affection should call for a nephrotomy and not for a nephrectomy. The removal of the stone would then be required in addition, and possibly such removal would be so difficult or necessarily so incomplete that the removal of the entire organ could alone meet the indication.

To summarize it, then, the presence of a stone in a kidney calls for either a nephrotomy or a nephrectomy; and we have next to examine the details of those two operations.

The kidney can be explored, incised, or removed through the peritoneal cavity (the trans-peritoneal method) or through the loin (the extra-peritoneal method), or by a combination of the two.

It is so generally admitted that the extra-peritoneal method is to be preferred as the safer, and the field of the trans-peritoneal method is so steadily becoming more and more restricted to a few non-calculous affections, that I shall say nothing about the latter, except that the incision into the cavity is best made along the outer border of the rectus abdominis, and the second incision of the peritoneum made on the outer side of the colon, so as not to injure the vessels supplying it. Of the method which combines the two incisions I shall only say that it has been successfully employed in several cases by Thornton; he explores the kidney through the peritoneal cavity, determines the presence of a stone by touch, and then, while fixing the kidney with a hand in the abdomen, cuts down upon it through the loin by a small incision, carries the knife through the kidney-tissue to the stone, and extracts the latter with forceps. It is quite possible that the anterior peritoneal incision, in competent hands, adds but little to the risk of the operation, and that the objections to it which so promptly suggest themselves are not fundamental or important; but still it appears that the method would be efficient only



in cases of a single small stone in a comparatively healthy kidney, and that it would probably be inferior to the posterior operation, both as an aid to diagnosis and as a therapeutic measure, when multiple stones or abscesses were present or when the stone was large and irregular.

The posterior route, then, is the one to be preferred, and the operation will be wholly extra-peritoneal, except in certain cases.

*The incision.* This may be longitudinal, along the border of the sacro-lumbalis, or transverse between the rib and the ilium, or a combination of the two. If the former is used the patient should be placed in a position that is inclined 30 or 40 degrees from the prone toward the opposite lateral, and the trunk should be laterally flexed so as to increase the space between the twelfth rib and the crest of the ilium on the side of the operation. If the transverse incision is used the inclination toward the opposite lateral position may advantageously be greater.

The *longitudinal incision* is made along the outer border of the sacro-lumbalis mass, which can be readily recognized by the finger, about two-and-a-half to three inches from the median line, and should extend through the skin from the level of the eleventh rib to that of the border of the ilium. It is deepened, layer by layer, until the strong middle layer of the lumbar fascia, or aponeurosis of the transversalis, is reached, after dividing which the posterior surface of the quadratus lumborum is exposed. The outer border of this muscle is cleared and drawn toward the spine, and then the fat enveloping the kidney can often be seen through the thin anterior layer of the lumbar fascia, moving up and down with the acts of respiration. Space can be advantageously gained by dividing the outer portion of the quadratus close to its attachment to the ilium. On division of the thin intervening fascia the fatty capsule of the kidney is reached, and by tearing through it and stripping it towards the sides the posterior surface of the middle and lower portions of the kidney and its pelvis is exposed to sight and touch.

Except in persons who are very fat, a condition not often associated with calculous affections of the kidney, this incision gives ample room for exploration and nephrotomy, and even for nephrectomy when the kidney is not very much enlarged. It

has the advantages of not weakening the abdominal wall and thereby predisposing to hernia, and of not carrying much risk of opening the peritoneal cavity. On the other hand, the irregular relations of the pleura and the absence or incomplete development of the twelfth rib in a certain proportion of cases expose to accidental wounding of the pleura, a complication that has occurred and has proved fatal. Holl found the twelfth rib absent in three of sixty cadavers examined—five per cent.—a proportion so unexpectedly large that it is now deemed an important precaution to count the ribs before beginning the operation.

A portion of the twelfth rib, and even of the eleventh, has been resected in a few cases in order to gain more room upward, a procedure which, of course, involves additional risk of wounding the pleura. Some room can be more safely gained by drawing the rib forcibly upward with a blunt hook.

The *transverse incision* is begun just within the outer margin of the sacro-lumbalis, a little below the twelfth rib, and carried outward parallel to the rib for about four inches. The muscular and aponeurotic layers are successively divided, after recognition, until the retro-peritoneal layer is reached, and the kidney exposed by division of its fatty envelope as in the preceding description. Additional space can be gained by a short longitudinal cut at the spinal end of the main incision.

The especial advantages of this incision appear in nephrectomy when the kidney is much enlarged. When the exceptional indication for resort to it arises from the great size of the kidney or from its close inflammatory attachment to the peritoneum, this incision permits an easy and free opening into the peritoneal cavity, through which the hand can be introduced to draw the kidney outward and to facilitate the securing of the pedicle and other later steps of the operation.

*The Incision of the Kidney—Nephrotomy—Nephrolithotomy.*

The kidney having been reached, and its posterior surface and pelvis having been freed as far upward as possible from its fatty capsule, the surgeon proceeds to seek for signs of the presence and location of a calculus. He may be able to recognize it

by touch, grasping the kidney between the thumb and finger; or its position under the thinned cortex may be indicated by a rounded bulging of the surface and a deepening of the color; or the stone may be touched with the point of a needle introduced through the parenchyma or the wall of the pelvis. This latter mode of exploration has been proved to be free from serious risk, and when employed should be made systematically so as to explore all accessible portions of the kidney, the needle being introduced at intervals of about half an inch.

The incision for the removal of a stone has usually been made through the posterior wall of the pelvis, and it has been made with the knife rather than with the cautery; but some recent experience has shown that an incision through the substance of the organ into the pelvis has some advantages and does not expose to troublesome hemorrhage. Such pressure as can be readily made by sutures checks the bleeding, and it is believed that a urinary fistula is then less likely to be established than after incision of the pelvis. If the stone lies under a changed and projecting portion of the cortex it should be reached by an incision through the cortex radiating from the pelvis to the convex border.

If the stone is small and free in the pelvis, or in a dilated calyx, or in a pouch formed about it in the cortex, its removal is easy; it may be picked out with the fingers or forceps; but if it is large, irregular, or adherent, its removal may be very difficult; it may be necessary to break it into pieces, to divide intervening septa, or to open into separate, adjoining pouches. For the division of septa strong scissors are probably better than the knife or the cautery. To break a large irregular stone a lithotrite or strong sequester forceps may be used. To remove stone from cavities with irregular approaches, scoops of most varied and bizarre shapes have been designed, few of which have received the approval of others than the inventors, and all of which might still leave the surgeon unprovided with the particular shape that was desirable for the case in hand. In a number of the reported cases the surgeon has expressed the opinion, or the autopsy has shown, that stones have been left undiscovered or unremoved.

Occasionally the stone has proved to be so large, or the stones have been so numerous and so difficult of removal, that it has seemed wiser to remove the entire organ, to do a nephrectomy instead of a nephrolithotomy.

The orifice of the ureter should next be sought and that canal explored to determine whether it is free or whether plugged by a stone or a mass of fibrin. If such an obstruction is found it may, perhaps, be pressed downward into the bladder, or washed out, as was very ingeniously done by Dr. Lange, by a stream of water directed into the distended ureter through the wound.

The stone or stones, having been removed, the incision in the pelvis or in the substance of the kidney may be closed with sutures to hasten its repair and diminish the chance of the establishment of a urinary fistula.

Provision for the drainage of the wound and the prompt removal of urine that may escape into it is made by a rubber drain and iodoform packing; the external wound is partly closed by sutures at its ends, and a large absorbent dressing applied.

*Nephrectomy.* The details of the enucleation and removal of the kidney vary greatly in different cases, according to the varying conditions of the organ. If inflammation and suppuration have not caused the fusion of the fatty capsule and the cortex into a single lardaceous layer, or united the kidney closely to the peritoneum or colon, it is comparatively easy after having reached the posterior surface of the kidney, to work the fingers around its convex border and its two extremities and separate it from all its attachments except the sort of pedicle constituted by the renal vessels and the ureter. This pedicle may be ligated in sections, the ligatures being passed by means of a large, full-curved aneurism or pedicle needle, or occasionally the artery can be isolated by sight or touch, and tied separately, or the entire pedicle can be tied *en masse*. If the latter course is followed I think the elastic ligature should be used. In some cases instead of a ligature a long, strong clamp has been placed on the pedicle. In making such an enucleation the operator must proceed with great gentleness, especially at the extremities, where abnormal vessels may be encountered,

and he must not draw the kidney too forcibly into the wound lest he tear the vessels.

If the kidney is much altered and adherent the need of care in detaching it is still greater. The accidents that have happened are varied and serious: laceration of the peritoneum, colon, and even in several cases of the vena cava with immediately fatal result. When the adhesion of the anterior surface of the kidney to adjoining tissues has been very close it has been successfully practiced to remove the posterior half of the organ and then to scrape away from the remaining cut surface so much as it seemed safe to remove. The healing of the wound may require a somewhat longer time, but that is not an excessive price to pay for the greater security.

If the ureter had been separately divided it is well to close it with a ligature.

The pouch left by the removal of the kidney needs to be drained, packed with iodoform gauze, and protected by a large dressing outside.

It may be well to add that some surgeons, impressed by the desirability of preliminary ligature of the renal artery, have employed and recommended extra-peritoneal approach to the kidney by a longitudinal incision in, or somewhat in front of, the axillary line; when the peritoneum is reached it is stripped back to the kidney and then off its anterior surface until the renal artery is exposed and tied. Enucleation is then completed as in the previous case.

#### C. STONE IN THE BLADDER.

*What special indications should govern a choice of operation as between Lithotomy and Lithotripsy.* BY EDWARD L. KEYES, M. D.,  
CONSULTING SURGEON BELLEVUE AND CHARITY HOSPITALS.

In the few minutes allowed me for a consideration of this subject, I shall shape my discussion chiefly upon deductions justified by the application of unproved modern methods of diagnosis, and upon the crystallization of such experience as it has been my fortune to gather during twenty-five years of active work in the Genito-Urinary field.

Facts are eternal and the premises from which conclusions must be drawn are not changed from what they have always been, but our appreciation of the significance of facts varies. Old conclusions must now be modified by the light thrown from the three brilliant modern foci.

I. The admirable results of litholapaxy as applied to male children.

II. The undoubted triumphs of cystoscopy in perfecting diagnosis, more particularly as to the physical condition of the urinary tract.

III. The accumulating confidence of those who are testing the value of supra-pubic prostatectomy, as a radical measure for the relief of the enlarged prostate.

These three considerations are the only ones I recognize as powerful in modifying our choice of operation, from what it would have been five, or even three, years ago.

This is the day of attempts at exact physical diagnosis. Time was but is no longer, when a reputable surgeon may presume to advocate any one operation as applicable to all cases of stone. The same common sense and logical weighing of his patient's necessities must shape a decision in selecting the operation in this as in any and every other surgical field.

To approach the subject then from its most material side, I ask: Is the size of the stone now a prime factor in deciding the method by which its removal should be undertaken? At the present day and date the answer must be decidedly—No.

Of course small stones are easier to dispose of than large ones, by the lithotrite, and it seems natural that they should receive this method, larger ones being left to the knife. Yet this is so only in a negative sense, namely: a large stone, if large enough to be mechanically beyond the clasp or the strength of the lithotrite, cannot be managed by this instrument; but aside from this the size of the stone is a matter of no significance at all.

In a sort of negative sense even the paradox may be sustained, that the smaller the stone the less is it suited for the lithotrite in any but very expert hands. For one of the slurs cast upon lithotrity by its enemies is that it often leaves behind a last fragment to become the nucleus of a new stone.



Yet if this last fragment, as is the fact, be so hard to find, even by a competent lithotritist, how much more difficult must be the finding of a very small stone, than of a good sized one, by a surgeon inexperienced in the use of the crushing instrument—for surely there can be no doubt as to the relative skill required to perform creditable lithotrity as compared with creditable lithotomy.

I demonstrated this in a statistical paper, discussing the value of the then new operation, litholapaxy, many years ago<sup>1</sup> wherein it appeared that the percentage of mortality diminished rapidly as the number of operations by a given surgeon multiplied. At that date the death rate was  $2\frac{1}{2}$  per cent. for surgeons having performed five or more than five operations, while it was 13 per cent. for surgeons having performed less than five operations each.

Any competent surgeon who can handle his knife well in general work can perform lithotomy perfectly, but he cannot perform lithotrity well until he has trained his hand by actual experience in a number of cases.

For this reason alone lithotomy is, has been, and justly must always continue to be the more popular operation with the general body of operating surgeons; but beyond this there are also other considerations in modern days throwing the balance in favor of lithotomy.

For, notwithstanding that the statistics of lithotrity (or litholapaxy, for this is modern lithotrity,) are splendid in competent hands, and that in such hands if the stone can be crushed it may generally be safely crushed, yet, even in such hands, the whole question ought to be not does the stone justify crushing, but does the physical condition of the patient and of his urinary tract justify lithotrity?

And this view of the matter should, I think, obtain all through life. The age of the patient has nothing to do with it, and the stone nothing—except in lending itself mechanically to the possibility of lithotrity.

The very exceptionally brilliant results obtained in India by Keegan and by P. J. Freyer, with a wonderfully minute mortality, and repeated with less brilliancy in other countries, show

<sup>1</sup> Am. Jour. of the Med. Sc., April, 1880.

that the very young male infant, even with large calculus, is a most fitting subject for successful litholapaxy.

If the stone in the infant or child be too large for such crushing instruments as will pass his urethra, it is also too large for proper extraction by the perineal route, and the supra-pubic operation is called for; otherwise litholapaxy should always be the operation of choice. For even the male bladder, before puberty, with its dependent orifice and no prostate, needs no surgical drainage—take out the stone by crushing and nature does the rest.

I think it, therefore, safe to say, before puberty in either sex, always crush when practicable; for large stones cut above the symphysis. It is far easier to crush successfully in the smooth bladder of the child than in any other.

In middle life some foreign bodies (glass, pins, pencils, etc.) naturally demand the knife, and the perineal route may be properly preferred, yielding as it does a less mortality than the supra-pubic, and being often as suitable for the detection and safe removal of the offending body.

But aside from such adventitious nuclei, when the stone alone is considered, in the period between early adolescence and late middle age—say fifty—here assuredly, if the stone be very large, the high operation is suitable, while, if it can be dealt with by the lithotrite, it should be crushed and washed out, unless the physical condition of the parts contra-indicates this method.

These physical contra-indications are few, being notably tight, deep urethral stricture, intense, long standing cystitis with altered mucous membrane (needing prolonged rest and drainage,) sacculated stone, or concomitant vesical tumor.

Of these conditions two—urethral stricture and chronic cystitis—call for the perineal operation, the first median with liberating lateral vesical incision if required; the second lateral, the bladder neck being well cut into to ensure prolonged free drainage; while the sacculated stone and concomitant vesical tumor naturally demand the supra-pubic opening. Here it is that the cystoscope lends powerful aid in deciding what course shall be followed.

I do not consider the existence of pyelitis momentous in deciding whether to cut or crush. It aggravates the prognosis in either case.

If the stone be too large for crushing here, as in the child, and for the same reason, the supra-pubic route should be elected.

Finally we come to the old man, and it is here, in my opinion, that modern experience instructs us to reverse some of our earlier conclusions.

Formerly it was exactly in these cases that lithotripsy (or litholapaxy) was most ardently advocated, for it was contended that with the large prostate there was no hope of having a healthy bladder, even after cutting, therefore why take the risk of the knife, and if the patient was in catheter-life why not employ the lithotrite, take away one of his sources of irritation and let him keep on using his catheter.

Now, while this argument holds its force still, in the case of those old prostatics whose toughened urethræ make no protest against the frequent introduction of instruments, and who do not fret under this necessity for the mechanical performance of a natural function, yet there are a set of cases which I, at least, am learning each year to respect more and more—on account of an unhappy experience with some of them—cases in which the necessary mechanical disturbance attending litholapaxy so stirs up the vesical neck—whether every fragment be removed or not—that cystitis more or less intense and prolonged follows the operation, and both the patient and surgeon come to regret that the more radical cutting operation had not been decided upon at first.

In this class belong (1) prostatic cases that have not used a catheter at all, or have not become habituated to the instrument; (2) most of the pallid, flabby, fat subjects, who show early the corneal arcus, and especially, it seems to me, (3) those who exhibit a tendency to recurring localized eczema (notably of the extremities) and to flatulent dyspepsia.

These cases, if properly prepared, do very well under lithotomy, and in them the supra-pubic method should be adopted, because it allows the surgeon to deal at a single sitting not only with the minor necessity—the small stone—but also with the more important and permanent disability—the enlarged prostate, by prolonging the supra-pubic lithotomy into a prostatectomy—and making the patient's necessity become the surgeon's opportunity.

*On the Choice of Operation for the Removal of Stone from the Bladder.* By L. BOLTON BANGS, M. D., SURGEON ST. LUKE'S AND CHARITY HOSPITALS.

Within the past few years the operation of Suprapubic Lithotomy has become so popular in the minds of surgeons and has met with such remarkable success, that for the present at least, the question may be narrowed between it and some form of Lithotrity.

The older methods of Perineal Lithotomy, median or lateral, seem to be almost entirely discarded excepting in the case of children. My own personal experience in this operation has been exclusively limited to children. Therefore in stating my own views I mean by the term Lithotomy, Suprapubic Lithotomy; all others being left out of consideration.

The Perineal Lithotrity of Dolbeau being extremely limited in its application and not having gained much of a footing in this country, I shall speak of *Lithotrity* only in two forms, one being the application of a crushing instrument to a small stone in an easily accessible bladder, the other form being that which is known by the term Litholapaxy; namely, repeated crushings at one sitting with as many evacuative pumpings till the entire stone is removed; the patient being under the influence of an anæsthetic.

The first of these is applicable to only a very limited number of cases, where, for instance, the stone is of recent formation or where it has but recently descended from the kidney, and having been retained in the bladder, is exercising an irritation upon that viscus. In such cases one application of the instrument either with or without an anæsthetic will usually crush the stone thoroughly and the few small fragments may either be removed by evacuating instruments at once or left to be expelled by nature's way. The second form, or Litholapaxy of Bigelow, being the one applicable to the vast majority of bladder calculi, I will venture to limit my share of the discussion to the indications for choosing between *it* and *Suprapubic Lithotomy*. The object of an operation is not only to remove from the body the cause, or active agent of suffering, but to do

it safely and quickly without adding to the jeopardy of the patient; and also to place the patient in a state, which shall conserve his future health and well-being. Hence a given case must be approached without any prejudice in favor of one operation or another and the conditions under which the operation is to be undertaken must govern very largely the choice.

The age of the patient, his or her vigor, the conditions of the kidneys, bladder and prostate (if a male) must all be considered in turn. The relative mortality also of the two operations must be borne in mind. For, whereas at present we have a mortality in litholapaxy of less than 2 per cent., in suprapubic cystotomy (for all purposes) it is, according to the latest statistics, in the neighborhood of 5 per cent. Furthermore, the liability to relapse after litholapaxy especially in old men with atonic and catarrhal bladders associated with hypertrophied prostate, must also be taken into account.

In order to be more definite and to make clear the reasoning upon which the choice of operation should be based permit me to narrate briefly typical cases.

A man of about fifty years of age presents himself with the characteristic symptoms of stone in the bladder; namely, frequent and painful urination, with a varying amount of mucopus, and occasionally blood in the urine, the latter feebly acid in reaction; pain in the bladder, increased by vigorous locomotion or by jolting.

Upon examination, the bladder is found to be easily accessible to instruments, and a stone of medium size is ascertained to be within it. His general condition is good, and there is no evidence in the urine of any serious condition of the kidneys. There is no evidence of any prostatic hypertrophy, nor is there from the history any evidence of prolonged catarrhal inflammation of the bladder. With such a typical case it seems to me that an unhesitating decision should be given in favor of the crushing operation or litholapaxy.

Again, a man with the following history. He is fifty-six years of age, has had for several years a history of urinary disorder, *i. e.*, frequent, painful and bloody urination, the pain and frequency modified somewhat by intercurrent conditions of

health, but of late his symptoms have been increasing in intensity to such a degree that he now seeks surgical aid.

On examination it is found that there is some difficulty in entering the searcher; that the depression of the handle of the latter, together with the presence in the bladder of two or three ounces of residual urine containing pus in moderate degree, indicates median hypertrophy of the prostate. Exploration of the bladder with the cystoscope, which can be readily done, shows that although the organ is trabeculated and has lost the glistening character of its mucous membrane, it is not sacculated or otherwise seriously affected organically and that there is but one stone within it. Moreover, examination of the urine, which is of a specific gravity of 1020-1022, reveals only moderate evidence of disease of the kidneys; *i. e.*, besides a small percentage of albumin, an occasional granular cast. His general condition is excellent and although he has been a sufferer from his bladder for several years he has not yet had much impairment of his vigor. Under these conditions I would again advise the operation of litholapaxy.

Take another case, in order to illustrate more definitely my proposition. A man aged seventy-two. Although several years older than the preceding patient his conditions are somewhat similar; *i. e.*, a moderate amount of prostatic hypertrophy, an uncomplicated bladder wall, and only a slight amount of evidence of degeneration of the kidneys. His bladder is easily reached by instruments, and is apparently accessible in all its parts. Moreover, there is but one stone present in the bladder and it is of a little larger size than the medium. In such a case I would also recommend the operation of litholapaxy.

With these three cases of different ages may be contrasted a case of a man aged only forty-five, in whom the following conditions are present:

There is no hypertrophy of the prostate, but there is an exceedingly sensitive and hyperæmic urethra and an exceedingly sensitive bladder, compelling him to urinate at frequent intervals. Any instrument, no matter how gently introduced, is grasped by convulsive contractions of the bladder, and a stone is found at the first searching; but all subsequent searchings fail to reveal any. There is no evidence of disease of the kidneys, but there



is evidence of marked catarrhal condition of the bladder, which, associated with this convulsive muscular contraction, makes it strongly evident that besides the removal of the stone physiological rest must be secured for the viscus.

In this case accordingly I did a supra-pubic cystotomy and removed a stone which had been caught behind the pubes by this undue and irregular contraction of the bladder. Subsequent drainage, continued for a week or two, restored this individual to permanent health.

In this case, although the age and general conditions of the individual pointed to the simpler operation of litholapaxy, yet the bladder conditions were such that I felt compelled to choose the operation of lithotomy. Here, then, may be seen some of the specific conditions which render the choice of operation difficult, but which was finally decided by the condition I have quoted.

Now, in further illustration of the indications for choice, take another type of cases :

A man aged sixty-two who has had for several years pains over the pubes following each act of urination, pain felt at the head of the penis, reflex pains at different parts of his body and whose sufferings have become excruciating. Although a temperate man of good constitution and of excellent clinical history, he is losing ground rapidly and his vigor is being wasted by continual suffering. The introduction of a searcher into his bladder is attended with difficulty ; not only a median but lateral hypertrophy of the prostate is found, and there are evidences in his urine of considerable degeneration of the kidneys.

In my opinion, although the lithotrite can be entered, the stone or stones seized and crushed and the evacuating instrument entered also, it is better, in view of the prostatic obstruction and the condition of bladder and kidneys, to do the speedy operation of supra-pubic lithotomy. This will not only be less likely to do damage to his already inflamed and softened bladder, but will give him the advantage of drainage for the relief of that inflamed organ.

In such a case my choice would be determined by the gravity of the bladder condition ; because, although the stone might be easily crushed and removed, there would be a strong liability to relapse, even if only a small fragment happened to be left behind.

The cleaner and quicker the operation in such cases the better, and certainly in this respect the lithotomy is more desirable. I will admit that sometimes—although the symptoms of the patient seem to warrant the opinion that the bladder is uncomplicated, that but one or two stones of moderate size are present, and that all the indications point to litholapaxy—when we come to the operation itself this may be found to be of greater gravity than we had supposed. It has been my own experience in operating upon a patient aged seventy-four, upon whom a year previously the operation of litholapaxy had been done by a competent surgeon, to find within the bladder three large fragments left there after the previous operation, and in addition to find upon close inspection of the wall of the bladder a diverticulum or cyst in which was also a stone.

In another case, recently reported by me, I began with the operation of litholapaxy, but was obliged to convert it into a supra-pubic lithotomy, because a large fragment of stone jammed the prostate across the urethra, thus preventing the introduction of instruments.

In the one case I profited by the experience of a colleague, and in the other the cause of my misfortune was not cleared up until the bladder was opened. In each of these cases perhaps more careful antecedent exploration might have rendered the choice of operation more definite, and that choice would unquestionably have been the lithotomy.

The use of the cystoscope in such cases would in all probability have rendered the choice more definite. Therefore it seems to me that if any uncertainty as to the character of the bladder, *i. e.*, whether its walls are cystic or not, or whether the prostate presents any difficulties, remains in the mind of the operator and which cannot be cleared up by the cystoscope, the operation, which not only permits the removal of the stone, but affords a means of inspection of the interior of the bladder, should be the one chosen.

Another factor in making a choice should not be overlooked, and this is the manipulative skill of the operator.

Mr. Reginald Harrison, in comparing the supra-pubic and lateral operations, says: "There can be no doubt that the former proceeding will recommend itself to many practitioners on the

ground that it is the simpler of the two, and if for this reason it is the more efficiently executed, no better ground can be advanced for its selection, provided that the same end can be obtained."

The same argument may be applied to the choice between the prolonged crushing operation of litholapaxy, which implies a certain amount of manipulative skill on the part of the operator, and in favor of the supra-pubic lithotomy, whose technique is very simple, and in these days of widespread knowledge of antiseptics is comparatively a safe surgical procedure.

## STUDIES UPON INJURIES OF THE KIDNEY, NEPHROLITHOTOMY AND NEPHRORRAPHY.

[CONTINUED<sup>1</sup>]

By AUG. SCHACHNER, M.D.,

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### NEPHROLITHOTOMY.

**P**ERHAPS the most debated question relative to the operative attack upon the kidney, is the choice of the incision to be employed for its exposure.

Simple as it may seem, the convenient exposure of the kidney is nevertheless even under favorable conditions very often far from being an easy matter, and, where there is an accumulation of fat, a thickening of the abdominal wall, or where the circumrenal fat is present in large quantities and the kidney itself firmly bound down through a short pedicle, it is sometimes an extremely difficult matter to secure sufficient room for a thorough manipulation.

Quite a number of incisions have been recommended as furnishing accessible means of reaching the kidney.

Apart from the usual incision in the median line, either above or below the umbilicus, Langenbuch has recommended one in the linea semilunaris, which would be practically over the anterior surface of the organ.

Mr. Tait<sup>2</sup> is of the opinion that it matters very little, as regards the immediate success of the operation, whether it is attacked through the lumbar or the abdominal route.

Although he strongly favors the abdominal incision, should a nephrectomy become necessary, on account of the facility it affords for the examination of the opposite organ before proceeding to its removal, but for simple nephrotomy, the lumbar incision is preferable.

Kocher usually commences the incision immediately below the ensiform cartilage. König has practiced an L-shaped incision, commencing at the last rib and running parallel with the erector

<sup>1</sup>Continued from February.

<sup>2</sup>Lawson Tait, Birmingham, Med. Rev., Sept., 1885.

spinæ muscle to within a few centimeters of the os ilium. The incision then curves around anteriorly in the direction of the navel, ending about the external border of the rectus muscle, and if necessary even through this to the umbilicus. If the space is still insufficient, more room can be obtained by separating the peritoneum with the hand.

Newman favors the incision employed in Amussat's operation, which he outlines by drawing a line from the center of the iliac crest to the free extremity of the last rib.

This line is intersected by another drawn through its center, commencing at the outer border of the erector spinæ forward for a distance of three, or three and a half inches. The wound is then carefully separated by the aid of two flat retractors. Mr. Morris leans towards the lumbar incision in nephrotomy, while in nephrolithotomy he prefers an incision made four and a half inches in length, parallel with and three-quarters of an inch below the last rib. The structures divided being the same as in nephrotomy.

Mr. Knowsley Thornton has recommended a combination of both lumbar and abdominal incisions, under the name of the lumbo-abdominal nephrolithotomy, in which he employs the abdominal incision primarily for the purposes of exploration and diagnosis while secondarily a small lumbar incision is reserved for the extraction of the calculus.

After seeing the variety of incisions offered for the exposure of this organ, it goes without saying that the operative mind is yet far from being in concord upon this individual question, and, after all, the choice of the incision must finally be determined by the condition which prompts the interference and shapes the operation. In short, there are but two principal incisions, the others being but modifications of these. The abdominal incision, which may either be performed in the linea alba, or the linea semilunaris, and the lumbar incision, or a modification of this.

The comparative merits of these two methods may conveniently be summed up in the succeeding lines.

The principal advantages urged in behalf of the abdominal route, are:

First, the ease which it affords for determining the existence and condition of a second kidney.

Secondly, in the instance of large tumors, or where for some reason there is danger of considerable hemorrhage, the abdominal incision is more preferable by reason of the easy access and the extended space it offers for manipulation.

Thirdly, Mr. Newman, in speaking of Langenbuch's incision, remarks, "That the kidney is not only easily reached, but the large veins in the anterior layer of the meso-colon are avoided. Besides this it offers an excellent drainage, and is practically an extra peritoneal operation."

Touching upon the latter incision in nephrolithotomy, Mr. Thornton<sup>1</sup> recapitulates its advantages upon this point as follows:

"We are certain that the patient has the usual allowance of kidneys. The chances of overlooking the stone, if there is one present in either kidney, are reduced to a minimum. I do not say that the abdominal handling is absolutely infallible, but in fourteen operations I have only once failed to find a stone, and the recovery and present health of this one patient, as already given in her own words, make it highly improbable that there was, or is, a stone in her kidney. This result compares very favorably with a large number of unsuccessful lumbar explorations already recorded. Greig Smith mentions twenty-five cases of unsuccessful lumbar explorations, *i. e.*, no stone could be found. There is no fear of cutting into the healthy kidney while the stone is in the opposite one—a serious accident which my cases demonstrate as liable to happen at any time by the lumbar method.

"There is no fear of accidental wound of either colon or peritoneum, because they are guarded by the hand in the peritoneum, while the kidney and stone are fixed, so that a small, clean cut upon the stone is all the damage inflicted upon the loin tissues. There is, consequently, infinitely less risk of extravasation of urine or of after-suppuratation, and no risk of a loin hernia. There is the great advantage of ascertaining what is the condition of the other kidney and that of both ureters."

Continuing, this surgeon remarks: "What are the objections to be set against these advantages?"

<sup>1</sup>Surg. of the Kidneys, J. K. Thornton, p. 36.



"Simply the making of two cuts instead of one. The increased risk, due to the opening of the peritoneum, is practically nil, *i. e.*, if the surgeon will take the pains to perform a thoroughly aseptic operation. I quite admit that this is the key of the position. If there is to be risk of septic infection of the peritoneum, then the combined operation is not justifiable; but I maintain that with proper care the mere opening of the peritoneal cavity and the manipulations in it necessary to examine the state of the kidneys and ureters, and to aid the execution of the lumbar extraction, are practically free from risk—certainly as free from risk as a large wound made through the loin tissues by a surgeon who is not cleanly enough in his work to avoid danger of infecting the peritoneum."

Quoting the opinions of other operators this author adds: "Morris says: 'But should we, under these circumstances, be ever justified in examining both kidneys from within the abdomen, I think we should, if the patient be clearly going into a bad way, more especially if there have been at any time marked crystalline forms in the urine, and if a digital examination of the vesical ends of the ureters gives a negative result.'

"In 1887, Bruce Clarke mentioned, at the Clinical Society, a case in which, with the lumbar incision, an hour elapsed before even the kidney could be found, and he adds: 'It would have been wiser to perform an abdominal operation.' The patient died."

In his speech at Leeds, he gives details of a most interesting case, in which a failure, by simple lumbar nephrotomy, was changed into complete success, by the aid of a hand in the peritoneum.

Yet, in the same debate, Morris spoke of the absence of any difficulty in finding the kidney by lumbar incision, and of the freedom from fatality and misfortune in this procedure. I know of at least one other case which has happened since, at one of the large London hospitals, in which the surgeon failed entirely to find the kidney by lumbar incision.

Morris also said, "What was wanted was greater precision in diagnosis." Precisely, and this is what my combined method gives.

Howard Marsh, in speaking on another occasion at the Royal Medico-Chirurgical Society, said: "One point in renal surgery seemed to be coming to the front—that many stones could not be reached from the loin. Our progress seemed to be in the direction of admitting the wisdom of abdominal exploration."

Time and experience tend liberally to the importance of arriving at an early diagnosis and instituting prompt interference.

Procrastination in this means untold suffering for the individual and the steady increase of the dangers militating against the ultimate success of the operation.

The force of such a statement can only be realized after a survey of Mr. Newman's tables, in which the mortality of abdominal nephro-lithotomies for suppurative disease amounted to 83 per cent. and that of the lumbar at 39.6 per cent. Against this is placed forty-two cases operated upon without suppuration with not a single death. These tables go further, in that they demonstrate the importance of the lumbar method where a suppurative process has already been established which is calculated to contribute to the infection of the peritoneum in the event of an abdominal operation.

While upon the subject of nephrectomy Thornton sums up the objections raised against the lumbar method, which, on the whole, bear a like relation as regards nephrolithotomy.

- "1. The small space available for incision in most cases.
- "2. The danger of wounding a pleura with a low insertion.
- "3. The danger of wounding the colon or the peritoneum, and of fouling the latter, without being aware of the accident.
- "4. The possibility of not being able to find the kidney at all, an accident which has happened in a large number of cases, and to experienced London surgeons.
- "5. The possibility of removing a single kidney without knowing that the patient has only the one.
- "6. The impossibility of noting the condition of the other kidney and ureter.
- "7. The fact that it is only suitable for a limited number of cases, it being impossible to remove much-enlarged kidneys through any incision that can be confined to the loin.

"The great point advanced in its favor is that, up to the present time, it has been more successful than the abdominal method.

Why? Simply because it has been the fashionable method, and the abdominal method has usually been a last resource in cases which were too bad to be operated upon by the lumbar method.

"Even so. Newman's tables show that there were twenty-one deaths in fifty-four fatal lumbar nephrectomies from shock and collapse, against twenty in sixty-six fatal abdominal nephrectomies from the same causes. I do not suppose any rational being will, in the present day, make the mere opening of the peritoneal cavity a reason against abdominal section and in favor of lumbar. Newman is undoubtedly right when he says: "If the relative position of the two operations were reversed, the mortality of the lumbar operation would be much higher than that of the abdominal one now is."

From the remarks of Thornton, which have so clearly and logically set forth the advantages and disadvantages of these respective incisions, it remains as a natural conclusion that in the vast majority of cases the abdominal is by far the most justifiable and philosophical operation.

The exceptions to which the lumbar method is addressed, are those in which for some reason there are grounds for suspecting the danger of infection of the peritoneum and the resulting consequences.

The congenital absence of one kidney is very rare. Mr. Morris, after carefully searching the post-mortem records offers the following comparisons:

Of 4632 inspections made in the ten years ending in 1882, at Guy's Hospital, there occurred one congenital absence or undeveloped rudiment of one kidney.

Of 2610 inspections made at the Middlesex Hospital during the ten years ending in 1883, there was no case of congenital absence or undeveloped rudiment of one kidney.

Of 3800 inspections made at Bartholomew's during the ten years ending in 1884, there was no case of congenital absence or undeveloped rudiment of one kidney.

Of 936 inspections made at the Hospital for Children, Great Ormond, during the ten years ending in 1884, there was one case of congenital absence and one of extremely defective development.

These four sources make an aggregate total of 11,978 examinations with three cases of absence or of extreme atrophy of one kidney or of one in every 3992 $\frac{2}{3}$  cases.

In addition, Mr. Morris repeats the estimates of Weir and Petersen, the former placing this abnormality at 1 in 5000 cases, and the latter in one in 1500, the combining figures being two in 6500 bodies, or one in 3250. Jacobson<sup>1</sup> and others have pointed out the importance of counting the ribs in performing the lumbar incision. The necessity of observing this precaution is best felt, when it is remembered that the dissections of Hall have shown that the pleural cavity in sixty cadavers descended as low as the first lumbar vertebra, or where the last rib is wanting it descends as low as the ligamentous band that supplies its place.

Prof. Dumreicher accidentally opened a pleural cavity with a lethal result, in an attempt to remove a pyelo-nephrotic calculous kidney. At the post-mortem the last rib was found rudimentary, and the pleura projecting a considerable distance below the lower edge of the eleventh rib.

Lange,<sup>2</sup> who has made rather extended study upon this anatomical point, has demonstrated that the pleura reaches even lower along the spine.

The question of hemorrhage is another that has ever occupied the surgeon's mind in all operative attacks upon the kidney.

While the statement that the hemorrhage from this source is easily controlled through the use of gauze, is inclined to produce an impression underestimating the difficulty of the same, a study of a number of injected kidneys has firmly convinced the author that at least in a number of kidneys it would have been impossible to have made an incision of scarcely any depth without creating a hemorrhage far too great to be conveniently controlled by this measure.

The hemorrhage which occurred in many of the experiments has suggested the importance of a means which would provide a bloodless, or almost bloodless, operation. In the attempt to

<sup>1</sup> W. H. A. Jacobson.—Symptoms and Conditions which Justify Nephrolithotomy. *Br. Med. Jour.*, Jan. 14, 1890.

<sup>2</sup> Observations upon the Surgical Anatomy of the Kidneys with special reference to the twelfth rib, the Pleura, the Diaphragm, etc. Frederic Lange, *Annals of Surgery*, October, 1885.

devise means for securing this end a variety of measures were tried, partly with the view of estimating their respective merits in securing a bloodless field, as well as determining their individual effect upon the coats of the renal artery. While a number of instruments affording different characters and degrees of compressions were employed, it was only in one instance in which there remained any ground for suspecting that an injury had

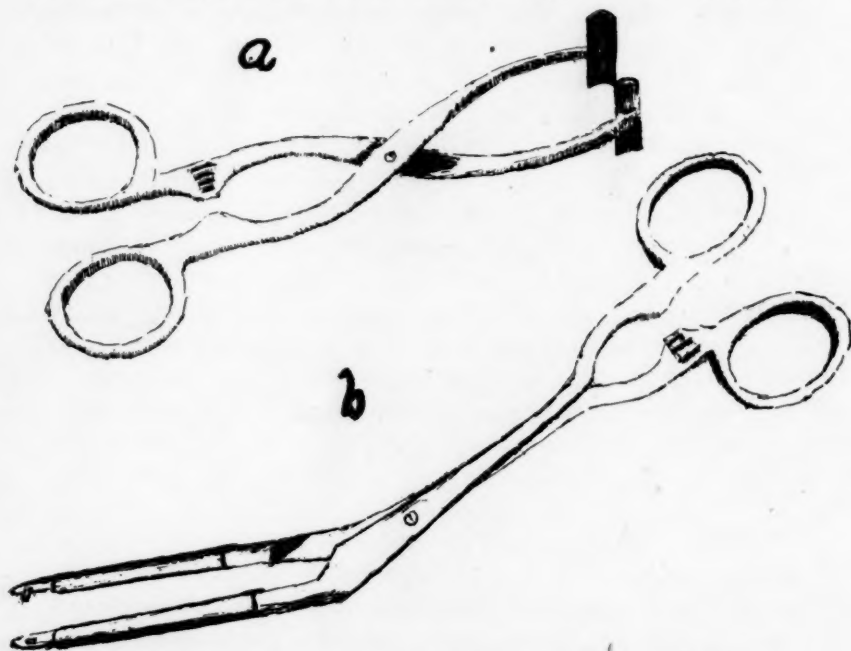


FIG. 7.—*a*, Imperfect clamp. *b*, Modified clamp for compressing renal artery.

been inflicted upon the arterial coats. In this a hard, wooden clamp was employed, with its blades very tightly applied by an assistant, who possessed an unusual degree of strength. Finally, a clamp was devised, armed at the extremity of its blades with two transverse segments, one of which was concave and the other convex. These were each covered with soft rubber tubing to moderate their effect upon the arterial coats.

Experience demonstrates the difficulty of securing, as well as retaining the renal artery. The groove was frequently too small for the artery, or the relation of the latter to the vein was such

that almost as much of the vein was compressed as the artery, increasing rather than diminishing the hemorrhage. In lieu of this a modification of the latter, which included the whole renal root, was tried. In applying these forceps the ureter may, or may not, be included within the compression. When applied a distance of a few centimeters from the internal border the blades passed clear of this duct, since it describes a short curve in a downward direction soon after leaving the kidney. The instrument in question is fashioned after an ordinary forcep. The blades are rounded, one of which is armed upon the inner side of its extremity with a small blunt spine, while the opposite one is perforated for the reception of this small projection; the function of the same being to guard against the possibility of the forceps slipping away.



FIG. 8.—Exploratory incision upon the external border.

When in use, the tissues are protected from any possible violence by carefully covering the blades with soft rubber tubing. The pressure can be regulated by means of three small cogs arranged near the handles.

During the compression of the renal artery there is not only a cessation of the hemorrhage, but the secretion of urine also becomes arrested.

According to Littre and Robart a ligature of the renal artery for two or more hours causes a necrosis of the epithelial lining of the contorted tubes and glomeruli. The time, however, required for the longest operation is not sufficiently lengthy to practically effect the kidney when rendered anæmic for such a purpose.

After the kidney has been subjected to a thorough examination by means of careful palpation and thorough exploratory



punctures with the needle, with a negative result as to the location of the calculus, its interior can then be exposed through an incision for a closer inspection. Should, however, a stone be located an incision performed over its greatest prominence is to be selected. Where no such a guide is at hand there are a variety of incisions that may be employed. The organ may be laid open through one made in the external border, or through one made in its transverse axis, or through one into the kidney proper just above the pelvis, or, lastly, through the pelvis itself.

As for the choice of these a great deal will depend upon the attending circumstances. An incision through the kidney structure, whenever practicable, is always preferable to one made through the pelvis itself, since the kidney structure not only



FIG. 9.—Exploratory incision through the transverse axis of the kidney.

heals more kindly than the pelvis, but, in view of its thickness, it is less liable to be complicated with resulting fistulous tracks. As for the respective merits of the other incisions, the transverse is, perhaps, the least desirable should a deep incision become necessary, since it affords but a limited access to the interior of the organ, unless it is carried to such an extent that would seriously jeopardize the safety of the organ. The selection of the incision, in the absence of a direct guide obtained either through palpation or an exploratory puncture, is between one in the external border and one made just above the pelvis.

The practical difference between these two incisions is that the one above the pelvis necessitates the division of less renal structure, and while it is a closer route to the pelvis it is nevertheless questionable whether it affords the most thorough exploration of the same. Because of its transverse nature it not

only exposes but severs the calyces and all the vessels of one side for the length and depth of the incision.

Although the incision performed upon the external border is through a much deeper layer of renal tissue, it affords not only a thorough exploration of the entire pelvis, but is also a favorable one for closure and repair. Its course being rather in the direction of the vessels and calyces, it allows an examination of the latter with as little as possible injury to the same.

The respective merits of these two incisions can only be determined after having been subjected to a more extended application.



FIG. 10.—Exposure of the pelvis through a semi-lunar incision.

Before the closure of the incision is undertaken, the kidney should be carefully freed of all clots that may have accumulated from the contained blood, the cavities thoroughly irrigated, and, unless otherwise indicated, securely closed by deep and superficial sutures, as already indicated under injuries.

If there is any available structure surrounding the kidney this can be carefully drawn over the same to reinforce the closure.

If an incision into the pelvis be undertaken it should be closed by the Czerny or double suture to more thoroughly guard against the occurrence of a fistulous track.

These are but additional remarks which are not intended to replace a more extended analysis of the details of this important subject.

## EXPERIMENTAL OPERATIONS UPON NEPHROLITHOTOMY.

EXPERIMENT 27. Oct. 21. Large size dog. Weight 24 kilograms. Left kidney exposed and the pelvis laid open by a semi-lunar incision made at one-third distance from internal border. This incision allowed a thorough exploration of the entire pelvis and the commencement of the ureter. The wound was closed by means of deep interrupted sutures of catgut that were immersed in tincture chloride of iron. The superficial edges were approximated by means of interrupted silk stitches. This afforded a perfect apposition. The surface was then covered with an apron of omentum. The whole organ was thoroughly irrigated with warm, sterilized water and replaced.

Given 4 Cc. of Magendie's Sol. and removed. Reaction followed promptly.

Oct. 22. Takes food.

Oct. 23. Appears lively.

EXPERIMENT 28. Dec. 2. The same dog used in previous experiment served for the present. The animal had entirely recovered and was ready for a second operation. The opposite kidney was exposed and its pelvis opened by an incision across the short axis of the organ. The lateral edges of the incision being more superficial than its central portions which extended down into its pelvis. This incision rendered the commencement of the ureter visible and allowed a complete exploration of the entire pelvis of the kidney. This operation was far more bloody than the preceding. The surfaces were apposed by deep sutures of catgut that had been immersed in tincture of iron. The superficial edges were brought together by interrupted silk sutures. The organ was irrigated with sterilized water and returned.

Given 4 Cc. of Magendie's Sol. and removed.

Dec. 3. Refuses food. Appears very thirsty.

Dec. 4. Same.

Dec. 5. Appetite improved. Thirst diminished.

Dec. 23. The animal met with an accident which resulted in its death.

P. M. The kidney upon which the lateral incision was practiced was found firmly united. Upon section a yellowish cicatricial tissue which represented the bond of union, was exposed. Upon exposure of its interior a few flakes of yellowish purulent matter were found. The kidney upon which transverse section was practised was found not as firmly united. The edges partly gaping. No adhesions upon this kidney.

EXPERIMENT 29. Nov. 3. Small size dog. Weight 8.5 kilograms. Kidney exposed and laid open with a bold incision through the short axis of the organ reaching to its pelvis.

This afforded a thorough examination of the pelvis and ureter. The kidney was closed by three deep sutures of ferrated catgut. The edges of the incision were approximated with interrupted silk sutures. This afforded perfect apposition with but a small amount of hemorrhage. The operation was made practically bloodless by a digital compression of the renal artery. The animal soon rallied.

Nov. 4. Walks about, but refuses food.

Nov. 5. Appetite improved.

Nov. 6. Eats well. Appears lively.

Nov. 7. Refuses food.

Nov. 8. Found dead.

P. M. Cavity clean; no adhesions. The divided edges rounded, patulous and in a sloughing condition. Catgut remained unchanged.

EXPERIMENT 30. Nov. 3. Large size dog. Weight 23 kilograms. Kidney exposed and compressed by means of a digital compression. The pelvis was laid open by an incision made into its external border extending from one to the other extremity. This afforded an excellent view of the interior of the organ. The kidney was brought together by means of six deep interrupted sutures assisted by superficial silk stitches.

Given 4 Cc. of Magendie's Sol. and removed.

Nov. 4. Walks about. Appetite good and appears lively.

Nov. 5. Same.

Nov. 6. Appetite diminished and seems to be losing ground.

Nov. 7. Diarrhœa. Mucoid stools streaked with blood.

Nov. 8. Gradually wasting. Appetite diminished.

Nov. 9. Same.

Nov. 10. Condition unchanged.

Nov. 11. Appetite better.

Nov. 12. Diarrhœa diminished and appetite improving.

Nov. 13. Improving.

Dec. 29. Appears lively. Diarrhœa has ceased for more than three weeks. Gained apparently some in weight.

Killed.

P. M. The incised kidney contracted to almost half its original size. The line of union firm. Omental adhesions throughout the entire incision.

EXPERIMENT 31. Nov. 17. Medium size dog. Weight 18.5 kilograms. Kidney exposed and rendered bloodless by digital compression. Pelvis and ureter laid bare by an incision through the short axis of the organ. Central portion of the incision being deeper than the lateral. After thorough exploration of the pelvis the wound was closed by deep interrupted sutures of ferrated catgut and the superficial edges by means of silk stitches.

Given 4 Cc. of Magendie's Sol. and removed.

Nov. 18. Appetite good. Appears lively.

Nov. 19. Same.

Dec. 18. The dog made an uninterrupted recovery.  
Reclaimed.

EXPERIMENT 32. Nov. 20. Small size dog. Weight 13 kilograms, Kidney exposed and rendered bloodless by digital compression. Pelvis laid bare by transverse incision, as in the preceding experiment. The incision was closed by deep interrupted sutures introduced near the extremities of the organ and the edges brought together by a second row of superficial stitches.

Given 4 Cc. of Magendie's Sol. and removed.

Nov. 21. Takes food and water, but appears quite weak.

Nov. 22. Improved.

Nov. 23. Good appetite. Appears active.

Jan. 3. Recovered. Killed to obtain the specimen.

P. M. Kidney slightly contracted. Omentum adherent.

EXPERIMENT 33. Nov. 20. Medium size dog. Weight, 14 kilograms. Kidney exposed and rendered bloodless by digital compression. The pelvis and ureter were laid bare by an incision into the long axis to the extent of one-half the length of the organ. The incision was closed by four deep sutures passed around almost the entire organ. The superficial edges were brought together by interrupted silk sutures. Given 4 Cc. of Magendie's Sol. and removed.

Nov. 21. No food. Quite thirsty and very weak.

Nov. 22. Slightly improved.

Nov. 23. Takes a small quantity of finely-chopped meat.

Nov. 24. Appetite better, but still weak.

Dec. 11. Eats well and appears hearty. Disappeared.

EXPERIMENT 34. Nov. 23. Medium size dog. Weight, 15.5 kilograms. Kidney exposed and pelvis laid bare by a semilunar incision made one-third above its internal border. This operation was rendered bloodless through the application of a wooden clamp

applied to the artery. Before closure of the incision the pelvis was carefully irrigated and freed from all remaining blood clots. The incision was closed by means of deep interrupted and superficial silk sutures. Given 4 Cc. of Magendie's Sol. and removed.

Nov. 24. Refuses food. Takes a few ounces of water.

Nov. 25. Took a few pieces of meat.

Nov. 26. Looks dull, appears weak, slight appetite.

Nov. 27. Quite weak. Takes a small quantity of meat. Very thirsty.

Jan. 10. Killed for further examination.

P. M. Firm union. Slightly contracted as compared with the opposite kidney. Omentum adherent.

EXPERIMENT 35. Nov. 23. Large size dog. Weight 26.5 kilograms. Kidney exposed and the pelvis laid bare by a semi-lunar incision into its side. The incision was made about half way between the internal and external borders. The operation was only partially bloodless, owing to imperfect digital compression. After irrigation of the pelvis and the removal of most clots, the incision was closed by the use of deep and superficial interrupted silk sutures. Given 4 Cc. of Magendie's Sol. and removed.

Nov. 24. Eats raw meat and drinks a large quantity of water which he soon vomits.

Nov. 25. Refuses food.

Nov. 26. Very thirsty. Takes but a small quantity of meat.

Nov. 27. Very weak.

Nov. 28. Same.

Nov. 29. Found dead.

P. M. Abdominal cavity contained about 350 Cc. of clotted blood. No adhesions. Renal wound gaping and of a softened appearance. Death from secondary hemorrhage.

EXPERIMENT 36. Nov. 27. Large size dog. Weight 22 kilograms. Kidney exposed and rendered bloodless by compressing the renal artery with a hæmostatic forceps, the blades of which were protected by covering with a piece of rubber-sheeting. The pelvis was explored through asemi-lunar incision made into the side of the organ. The incision was closed with a series of deep interrupted and superficial stitches. Given 4 Cc. of Magendie's Sol. and removed.

Nov. 28. Eats and drinks.

Nov. 29. Same.

Nov. 30. Improving.



Jan. 12. Sacrificed for further examination.

P. M. Incised surface firmly united and marked by an adhesion of the omentum, intestine and spleen. Upon section, the interior of the kidney partially destroyed. The deep sutures were visible and seemed slightly softened and enlarged.

EXPERIMENT 37. Nov. 27. Medium size dog. Weight 15.5 kilograms. Kidney exposed and rendered bloodless with a hæmostatic forceps as in the preceding experiment. An absolutely bloodless incision was made after the same fashion as in the preceding operation. The incision was closed by three deep interrupted silk sutures and a number of superficial stitches. Given 4 Cc. of Magendie's Sol. and removed.

Nov. 28. Takes a small quantity of raw meat.

Nov. 29. Same.

Nov. 30. Improved.

Nov. 31. Lively. Eats some raw meat. Continued thus in a very fair condition until Dec. 7, when he was exposed to cold.

Dec. 8. Refuses food and appears unwell.

Dec. 9. Found dead.

P. M. Adhesions upon the incised surface. The kidney somewhat disorganized and filled with a gelatinous pus. Death from nephritic abscess.

EXPERIMENT 38. Nov. 30. Small size dog. Weight 11.5 kilograms. Kidney exposed and pelvis explored through a lateral incision. The operation was made bloodless by compressing the renal artery with a specially prepared clamp. The wound was closed by a number of deep and superficial interrupted stitches. Given 4 Cc. of Magendie's Sol. and removed.

Nov. 31. Appetite fair.

Dec. 7. Eats hearty and appears comfortable.

Jan. 6. Apparently recovered. Good appetite, and appears lively. Sacrificed for further examination.

P. M. Kidney united. Omentum, spleen and intestines adherent.

EXPERIMENT 39. Nov. 30. Medium size dog. Weight 14.5 kilograms. Kidney exposed and pelvis explored through an incision similar to that in the preceding experiment. The operation was bloodless and completed in the same manner as in the foregoing. Given 4 Cc. of Magendie's Solution and removed.

Nov. 31. Refuses food.

Dec. 1. Took a small quantity of milk.

Dec. 2. Improved.

Dec. 3. Eats hearty and appears lively.

Jan. 6. Sacrificed for further examination.

P. M. Kidney firmly united, slightly depressed and apparently diminished in size. Omentum adherent.

EXPERIMENT 40. Nov. 19. Small size dog. Weight 4 kilograms. Kidney exposed and incised along its external border. This incision reached to a point about midway between the external border and edge of the pelvis. This was closed by a continuous silk suture. Good apposition and perfect hæmostasis was obtained. Given 2 Cc. of Magendie's Solution and removed.

Nov. 20. Up; appears lively; eats hearty, and is apparently unaffected by the operation.

Nov. 21. Same.

Dec. 26. Sacrificed for further examination.

P. M. Wound nicely united. Stitch visible beneath a layer of exudate.

#### NEPHRORRHAPHY.

Since the publication of nephrorrhaphy by Hahn in 1881, this operation, on the whole, has practically lost none of its original identity. The only effect which the last decade has occasioned in this direction has been the addition of different materials to be employed for its fixation, together with a few modifications which have added to the security of its attachment.

We must confess that it still remains for the future to offer measures which insure more certainty in these cases. The important questions in this connection which divide the surgical mind are the selection of the most desirable suture material and the decision as to the attachment which offers the greatest permanency in reattaching the displaced kidney.

As for the first, a variety of material has been recommended, *e. g.*, silk, cat-gut, silk-worm gut, silver wire and kangaroo tendons. So far as the preference in the selection goes, that, as yet largely depends upon the individual opinion of the operator.

Many favor cat-gut alone. Some a number each of cat-gut and silk-sutures, while a very large per cent. select the silk which experience has amply proven to be innoxious, besides having the advantage of offering more permanency in its fixations.

Bearing upon the different methods of securing its attachment. Dr. McCosh<sup>1</sup> upon this same subject has represented the four available methods which have already been resorted to.

"1. The adipose capsule, opened or unopened, is united by sutures to the edges of the incision.

"2. After freely opening the adipose capsule, the sutures are passed through the fibrous or true capsule of the kidney.

"3. After the free exposure of the kidney, the sutures are passed directly through its parenchyma.

"4. A certain portion of the capsule proper is stripped off the kidney, and the sutures passing through its parenchyma bring the raw surface thus made directly in contact with the cut tissues of the loin. The sutures enter and emerge through the capsule just outside the raw margin and are then passed through the tissues on each side of the incision which is closely united."

Apart from the main outlines here represented, there is yet a vast amount of detail which different operators have variously recommended.

A number of experiments were performed with the hope of devising a method which would offer more certainty or perhaps take the place of nephrectomy in the more rebellious variety of these cases.

The sutures were replaced by natural stays, in the shape of a pocket, formed between the transversalis and internal oblique muscles. The attempt in the beginning was very unsuccessful, the cause of which was later found not to be dependent upon a muscular compression, but to a traction upon the root of the kidney, especially when the operation was performed upon the right side. It was noticed that in every instance the left kidney was always more or less movable as compared with the right, and where the latter was selected it was always followed with an early death, dependent upon a traction of its root. With the exception of one or two, the implantations upon the left side were all successful. In the excepted cases, the death was not dependent upon compression, but rather to the effects of sepsis consequent to an imperfect drainage.

<sup>1</sup>The surgical treatment of movable kidney, A. J. McCosh, N. Y. Med. Jour., March 15th, 1890.

The experiments were mostly performed in the lumbar region, some however, were also performed through the abdominal route. In some the circumrenal structures were left undisturbed, the kidney being thus implanted in its new location, whereas in others all but the capsule were removed. In a few this was also stripped off, leaving the raw surface behind. On no occasion was the slightest evidence to be observed of any evil effect from the compression of the kidney.

When the kidney in its raw state was implanted, the whole organ became adherent, whilst if the circumrenal tissues were left, they alone became attached, whereas the kidney itself remained free within its surrounding structures.

The divided edges of the transversalis muscle were either brought in contact, or they were loosely sutured with the space of about one centimeter intervening.

In either event the edges finally united by a firm cicatrix.

In two of the experiments this principle was thoroughly tested as to its feasibility, at least in lower animals.

Soon after the kidney was successfully implanted the opposite one was removed in order to more fully determine the value of the implanted kidney.

In one, the animal was allowed to live about two and a half, while in the other, it lived about three and a half months, during the whole of this time upon the single implanted kidney.

Throughout the whole of this period there were absolutely no signs to be noticed of any discomfort whatever; the animals appeared lively, gained in weight, and, in short, presented a first-class condition. Externally the outlines of the organ were scarcely discernible and manipulation gave rise to no discomfort to the animal.

After the animal was sacrificed, the kidney in each was found nonadherent, the circumrenal tissues alone being attached to the adjacent sides of the muscle.

The organs were further submitted to a microscopical examination, in which it was observed that the capillaries were somewhat enlarged, a slight fatty infiltration and a granular degeneration of the cortex, limited, however, to the peripheral cortex alone.

The deep tubes and epithelium were normal.

A number of studies were made upon cadavers, with the intention of utilizing this upon the human subject.

The space between the last rib and the iliac crest is hardly sufficient to admit of a safe implantation.

In a few sufficient room might be obtained for its implantation, yet the space is shortened by different positions of the body, which

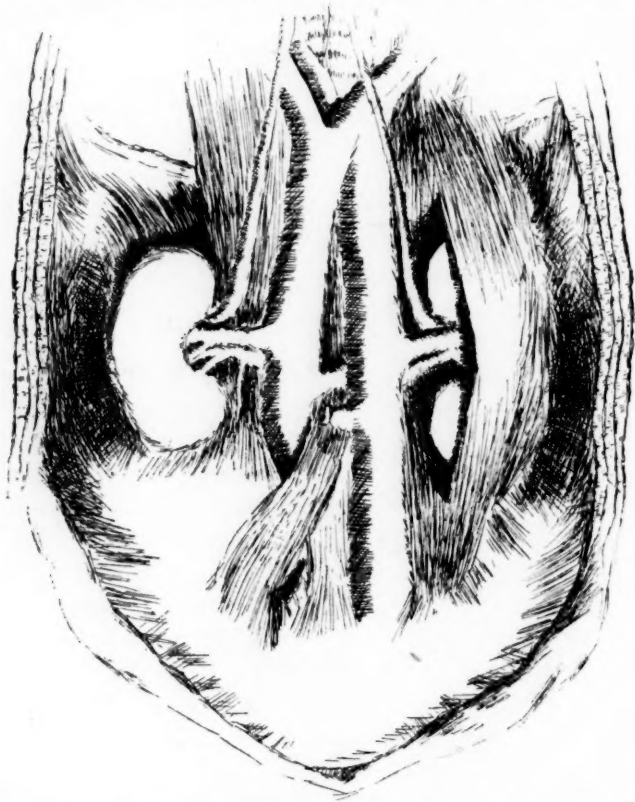


FIG. 11.—Showing the kidney implanted between the fibres of the psoas magnus muscle.

would seriously interfere with its safety. There is another region which would be perhaps better adapted for the reception of the organ than the abdominal wall.

The psoas magnus muscle can be divided near its external edge, in such a manner as to afford a thin muscular lamella, which forms the outer wall of a pocket.

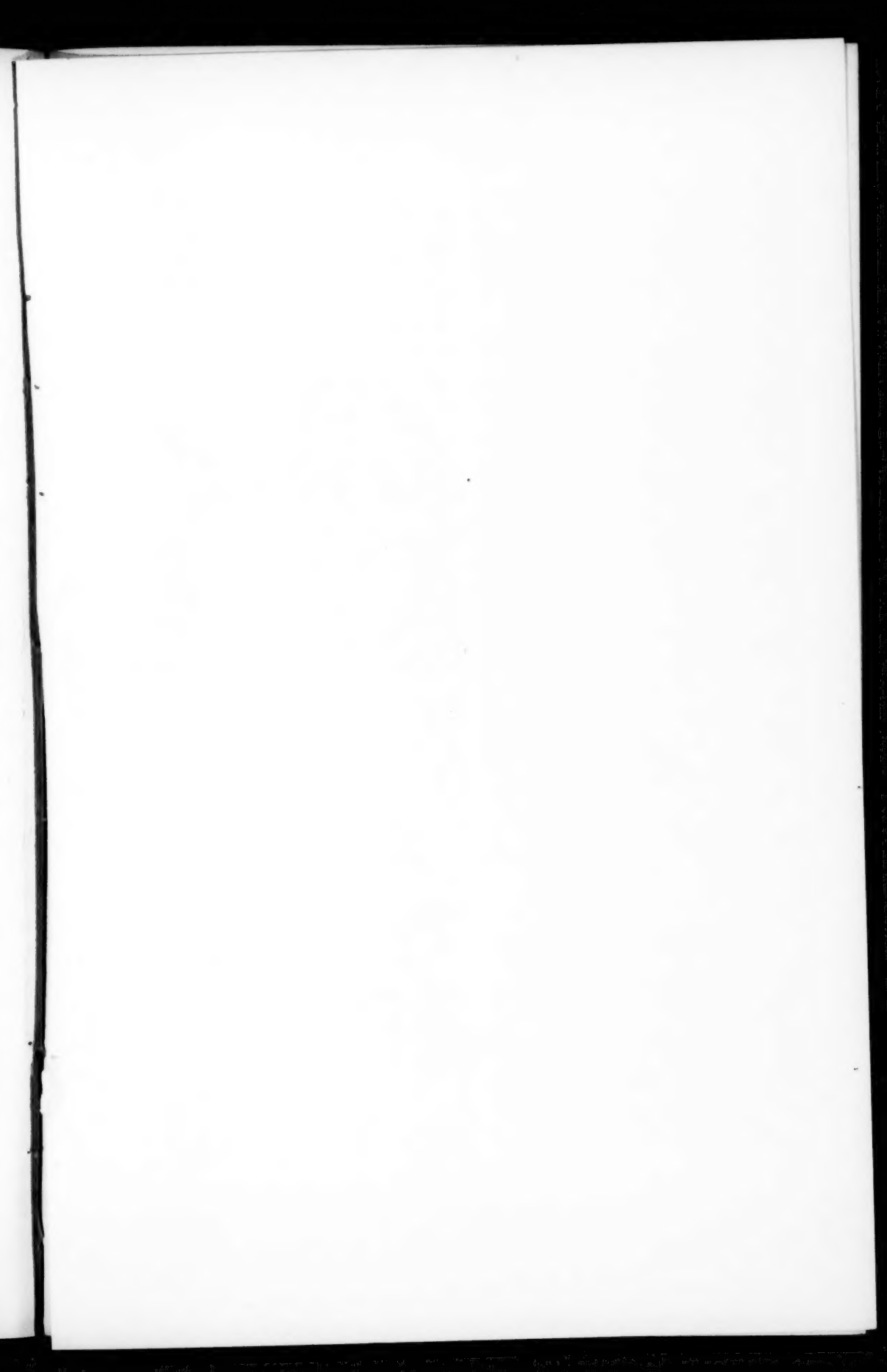






FIG. 1



FIG. 2



FIG. 3



FIG. 4

FIG. 1.—Destructive internal changes following an exploration.  
 FIG. 2.—Ulcerated exterior resulting from a peri-nephritic suppuration.  
 FIG. 3.—Frozen section of an implanted kidney.  
 FIG. 4.—Frozen section from within of an implanted kidney.

In a few the muscle was large enough to furnish a pocket of sufficient size to completely hold the organ, while in others this end was only partly accomplished. Where the pocket was large enough, the edges of the muscle were reunited over the inner border of the organ, leaving a suitable provision for its root, or where it was insufficient the edge of the muscle was united with the surface of the kidney itself. Should this upon further consideration assume a feasible aspect, it would only address itself to those cases where other methods had failed and this adopted as a *dernier resort* before recourse is had to nephrectomy.

Again, it could not be employed in every case, since this muscle in a number of cadavers was markedly insufficient to answer the purpose. It is also to be observed in dividing the muscle to cut clear of the vertebra, which insures a soft wall upon the inner side and a yielding one upon the outer side.

Besides this, care should be observed as to the depth of the incision, to avoid the lumbar plexus of nerves and lumbar arteries.

However Utopian this may seem in lower animals, we must be slow and careful in exercising boldness based upon experience gathered in this manner from the experimental field. The fact that many steps are feasible in lower animals that would be far from permissible in the human subject has not escaped the author's observation. And in offering this suggestion it is more with the hope that others more fitted than myself might enlarge upon whatever value it possessed, rather than the expectation of its feasibility or adoption in its present undeveloped state.

#### EXPERIMENTAL OPERATIONS UPON NEPHRORRAPHY.

EXPERIMENT 41. Aug. 10. Small size dog. Weight 4 kilograms. Median laparotomy. The kidney was drawn forward and freed of all the circumrenal structures. An incision of about 3 Cm. in length was made in the transversalis muscles parallel with its fibres.

A pocket was formed by dissecting the transversalis away from the oblique muscle by means of the finger-nail. The kidney was deposited into this pocket in such a manner that the long axis of the organ was at right angles with the fibres of the transverse muscle. The divided edges of the transversalis muscle were united by a continuous catgut suture and the abdomen closed.

Given 4 Cc. Magendie's Sol. and removed.

Seen few hours after the operation, the outlines of the kidney plainly visible externally and occasionally muscular twitching.

Aug. 11. Refuses food and seems unable to stand.

P. M. Died. Abdominal cavity contained 225 Cc. of bloody fluid. No adhesions. The parietes glazed with lymph.

Death from the effects of traction upon the root of the kidney.

EXPERIMENT 42. Aug. 12. Small size dog. Weight, 7 kilograms. The same operation as in the previous experiment was performed in this, differing only that in this the incision was made directly in the loin of place of the linea alba. The incision of each layer was made parallel with the long axis of the body, excepting the transversalis muscle, which was made in the direction of its fibres. The kidney was deposited in this pocket and the edges of the transversalis drawn within one Cm. of approximation. The other layers were each carefully closed over the implanted kidney.

Given 4 Cc. of morphia hypodermically and removed.

Aug. 13. Presents a somewhat dull appearance and refuses food. Unsteady walk.

Aug. 20. Eats and drinks heartily. Some of the stitches were torn out and the wound slightly gaping.

Aug. 28. Appears lively; eats and drinks. The wound entirely healed excepting the skin and second layer, which were still gaping.

Aug. 25. Wound almost united. Nephrectomy was practiced upon the other kidney, but the animal died from the chloroform just as the external wound from this was being closed.

P. M. The implanted kidney was found firmly imbedded and somewhat adherent. The edges of the transversalis were almost covered with omental adhesions.

EXPERIMENT 43. Aug. 18. Small size dog. Weight, 4 kilograms. Median laparotomy.

Both kidneys were carefully drawn into view and freed of all their circum-renal structures, including even the capsule of the organ. The kidneys presented a raw exterior and in this state they were replaced into the abdominal cavity. Cavity closed and given 2 Cc. of Magendie's Sol.

Aug. 19. \ Walks about, but refuses food.

Aug. 20. Lively; eats and drinks heartily.

Aug. 22. Appears well; eats and drinks heartily. The animal has assumed a very drawn up appearance.

Sept. 5. Same. Continues in the same deformed attitude. Killed for further examination. The kidneys were found movable and completely covered by adherent omentum.

EXPERIMENT 44. Sept. 13. Small size dog. Weight, 9 kilograms. The left kidney was exposed through a lumbar incision and with as little disturbance as possible to its surrounding structures implanted into a pocket formed between the transverse and internal oblique muscle; the overlying structures were carefully closed, layer after layer, by continuous sutures.

Given 4 Cc. of Magendie's Sol. and removed.

Sept. 14. Walks about and shows very little evidence of discomfort; drinks largely of water, but refuses food.

Sept. 15. Refuses food and water.

Sept. 16. Found dead.

P. M. The cavity contained 150 Cc. of purulent fluid, the kidney apparently unaffected by compression. Slight adhesions.

Death from sepsis.

EXPERIMENT 45. Sept. 13. Medium size dog. Weight 13 kilograms. Median incision, exposing the kidney. A pocket was formed by incising the transversalis at right angles to the course of its fibres. The kidney was implanted into this pocket and the transversalis carefully drawn over the edge of the organ to the extent of 1 Cm., and fixed there by continued silk suture introduced into the kidney structure. Slight hemorrhage from the renal stitches. The cavity was cleansed and closed. Given 4 Cc. of Magendie's Sol. and removed.

Sept. 14. Walks about. Takes water and milk.

Sept. 15. Same.

Sept. 16. Dead.

P. M. Cavity contained 200 Cc. of sero-purulent fluid. The line of union seemed perfect, but upon dissection two small abscesses were found communicating with the stitches. Slight adhesions. Death from sepsis.

EXPERIMENT 46. Sept. 30. Small size dog. Weight 4.6 kilograms. Medium laparotomy exposing kidney. This was separated from its perirenal structures and anchored beneath a ribbon-like strip of the transversalis muscle. The greater omentum was likewise drawn beneath this muscular band and made to envelop the kidney. The omentum and the kidney were reinforced with a few silk stitches. Cavity sponged and closed. Given 4 Cc. of Magendie's Sol. and removed.

Oct. 1. Walks about; refuses food.

Oct. 2. Same.

Oct. 3. Dead.

P. M. Abdominal cavity contained 75 Cc. of thin, sanguineous fluid. The kidney firmly fixed and covered with adhesions. Death from traction.

EXPERIMENT 47. Oct. 7. Small size dog. Weight 6.5 kilograms. Kidney exposed and found to be very movable. This was implanted between the internal oblique and transversalis muscles. The perirenal structures were left undisturbed, and in closing the transversalis muscle were included in the stitch. The oblique muscles were each carefully closed by distinct rows of sutures, followed by the superficial structures. Given 4 Cc. of Magendie's Sol. and removed.

Oct. 8. Walks about with unsteady gait. Refuses food.

Oct. 9. Eats and drinks. Shows no sign of discomfort.

Oct. 10. Same.

Nov. 13. Anæsthetized preparatory to the removal of the unimplanted kidney. The anæsthetic, however, was pushed with a fatal effect.

P. M. The implanted kidney firmly imbedded and of a normal appearance.

EXPERIMENT 48. Oct. 9. Medium size dog. Weight 5.5 kilograms. Kidney exposed and implanted into the abdominal wall between the internal oblique and transversalis muscles. The perirenal structures were preserved and included in the stitch employed for the closure of the transversalis muscle. The kidney was steadied by single stitch introduced into its external border.

Given 4 Cc. of Magendie's Sol. and removed.

Oct. 10. Eats freely. Appears able to walk but a short distance. Passes bloody urine.

Oct. 11. Eats freely and appears hearty.

Oct. 12. Same.

Oct. 13. Refuses food, but drinks a large quantity of water.

Oct. 14. Found dead.

P. M. Cavity contained 55 Cm. of sanguino-purulent fluid; few adhesions. Cavity dotted here and there with flakes of yellowish-green curds. Kidney bathed in pus and somewhat softened. Death from sepsis, arising apparently from the lumbar wound.

EXPERIMENT 49. Oct. 24. Medium size dog. Weight 21 kilograms. Left kidney exposed and implanted into the abdominal wall between the oblique and transversalis muscles. The overlying layers were each closed by separate rows of sutures.

Given 4 Cc. of Magendie's Sol. and removed.

Oct. 25. Refuses food.

Oct. 26. Eats and drinks.

Oct. 27. Same.

Nov. 7. Lively. Takes food freely and apparently recovered.

Nov. 12. Nephrectomy was performed upon the opposite kidney. In its removal the ligature slipped and a furious hemorrhage ensued. The vessel was again found, but only after the original incision was very much enlarged.

Given 4 Cc. of Magendie's Sol. and removed.

Nov. 13. Very weak. Refuses food.

Nov. 14. Improved.

Nov. 15. Eats heartily.

Jan. 26. Dog lively. Has gained in weight and suffers absolutely no inconvenience from his condition. External manipulation gave no pain whatever. The outlines of the kidney were indistinctly made out. Killed for further examination.

P. M. Kidney imbedded between the abdominal muscles, but the peri-renal structures alone were adherent. The kidney was free and devoid of adhesions and showed upon section no evidence of compression.

EXPERIMENT 50. Sept. 10. Large size dog. Weight 16 kilograms. Left kidney exposed and implanted between the transverse and oblique muscles. The circum-renal tissue was left undisturbed and in drawing the divided edges of the transverse muscle together the tissues about the root of the kidney were included in the stitches.

Given 4 Cc. of Magendie's Sol. and removed.

Sept. 11. Takes food and shows very little signs of the operation.

Sept. 12. Eats and drinks.

Oct. 15. Appetite good. External wound healed with the exception of a small sinus. The unimplanted kidney removed.

Oct. 16. Takes food and water.

Oct. 17. Appears lively.

Jan. 26. The animal appears well, eats heartily and has gained in weight.

The outlines of the kidney can be imperfectly made out by palpation. Killed for further examination.

P. M. The kidney loose and lies unaffected in its new position. The circum-renal tissues attached to the adjacent sides of the muscles. Upon section, the transverse muscle separates, exposing a portion of kidney free of all adhesions.



EXPERIMENT 51. Nov. 5. Small size dog. Weight 9.5 kilograms. Left kidney exposed and implanted between the abdominal muscles as in the preceding experiment. Given 4 Cc. of Magendie's Sol. and removed.

Nov. 6. Walks about. Takes food freely.

Nov. 7. Same.

Nov. 16. Appears lively; eats well and apparently recovered. The unimplanted kidney removed.

Nov. 17. Appears lively. Eats and drinks.

Nov. 18. Same.

Nov. 20. Death from an accident occurring during the removal of the animal to other quarters.

P. M. The implanted kidney unaffected and firmly attached in its new position.

EXPERIMENT 52. Nov. 7. Small size dog. Weight 7.5 kilograms. Left kidney exposed and implanted in the abdominal walls. Given 4 Cc. of Magendie's Sol. and removed.

Nov. 8. Refuses food. Drinks a few ounces of water.

Nov. 9. Eats and drinks.

Nov. 10. Same.

Nov. 28. Appears hearty. Eats freely. Anaesthetized preparatory to the removal of the remaining kidney. During this, the anaesthetic was pushed with a fatal effect.

P. M. The implanted kidney firmly imbedded. No evidence of any pressure visible.

EXPERIMENT 53. Dec. 21. Same dog used in this that served in experiment 14. The uninjured kidney was exposed through a lumbar incision and deprived of its capsule and circumarenal structures. It was now thoroughly enveloped in the folds of the great omentum and thus sutured to the abdominal wall. Given 2 Cc. of Magendie's Sol. and removed.

Dec. 23. Same.

Dec. 24. Took a few ounces of milk, looks dull and lies quietly in one place.

Dec. 25. Same.

Dec. 26. Improved.

Dec. 27. Appetite better and appears stronger.

Jan. 5. Still presents a dull appearance. Appetite varying and rather weak. The external wound had largely healed.

Jan. 29. The external wound had entirely healed excepting one fistulous track, which at times discharged a purulent fluid. From the

last to the present date the animal would eat well for a time while the fistula would be discharging, when this closed up the animal refused to eat, appeared drowsy and gave evidence of the absorption of septic matter.

Feb. 13. Dead.

P. M. The kidney that had been shut was firmly healed. The other was enclosed in an abscess cavity which communicated with the exterior through a fistulous track. The walls of the cavity were formed by the attached omentum upon the inner side and the abdominal wall upon the outer side. The kidney itself presented upon its exterior a worn and ulcerated surface.

Death from peri-nephritic suppuration.

#### RÉSUMÉ.

As deductions from the foregoing, I beg to submit for further consideration the following conclusions:

#### INJURIES OF THE KIDNEY.

(1) The disproportion which frequently exists between the cause and the effect in injuries of the kidney can alone be explained upon its peculiar anatomical structure, its physiological function and the frequency with which this organ is found in a more or less abnormal condition at the time of the accident.

(2) The external damage offers no safe criterion as to the extent of the internal injury.

(3) However slight the injury may seem, no definite conclusion can be reached as to its extent or its ultimate termination.

(4) In view of the uncertainty which ever surrounds the diagnosis of conditions in regions remote from the ocular inspection or the digital touch the prognosis should always be guarded.

(5) The sequelæ which frequently attend even trivial injuries should be kept carefully in view in rendering our prognosis and shaping our treatment.

(6) In all operative attacks upon the kidney, the capsule and perirenal structure should be preserved as carefully as possible, since these not only add to the strength of the purchase, but afford additional protection against hemorrhage and sepsis.

(7) A gun-shot injury amounting to a simple perforation is best controlled by the application of a "purse-string suture" to both orifices.

(8) This may be reinforced by a covering of peri-renal structure drawn together in a similar manner.

(9) The hemorrhage from superficial lacerating wounds of the kidney can confidently be arrested in the majority of instances by means of a single or double purse-string suture, applied one Cm. or more from its edge.

(10) The great omentum can frequently be employed as a valuable adjuvant in controlling the hemorrhage and in adding to the safety in many operations upon this organ.

(11) Incised wounds whose aseptic nature is questionable are best treated by tamponade and drainage through the loin.

(12) Wounds of the pelvis should be closed with a double row of sutures, as an additional measure against the formation of a fistula.

(13) Unless the wound of the ureter is singularly slight as compared to the size of the duct, nephrectomy is, as a rule, indicated as the most practical step.

(14) The incision in partial resection for the relief of an injury should be made distant from the contused region to insure the apposition of two healthy renal surfaces.

#### NEPHROLITHOTOMY AND NEPHRORRAPHY.

(1) The choice of the incision in all operative attacks is largely to be determined by the nature of the condition and the character of the operation.

(2) Where the operation is of the character of a nephrotomy, dependent upon some cystic or suppurative process, the lumbar is the preferable incision.

(3) Whenever the lumbar incision becomes insufficient the space can be enlarged by another incision in a horizontal manner after the precepts of König, or as recommended by Newman.

(4) Unless specially contraindicated by reason of sepsis or other valid causes the abdominal incision should be preferred.

(5) "Early diagnosis and successful treatment go hand in hand." (Newman.)

(6) Procrastination means untold suffering to the individual and the steady increase of the dangers militating against the ultimate success of the operation.

(7) The renal artery can safely and successfully be compressed, rendering not only the operative field bloodless, but adding to the thoroughness of the operation and the chances of its success.

(8) The closure of the wound, unless contraindicated by drainage, should be preceded by a careful irrigation of the pelvis and a thorough removal of all blood clots.

(9) Whenever practicable, an incision through the kidney substance should be given the preference over one performed through its pelvis.

(10) The bottom of a renal incision should be approximated through deep sutures while the superficial edges are united by a separate row of superficial stitches.

(11) If the kidney has been much disturbed it should be stitched *in situ*. (Jacobson.)

(12) In anchoring a floating kidney it should be replaced as nearly as possible in its natural location.

(13) In a dog the implantation of the kidney between the transversalis and internal oblique muscles is a practicable and feasible step.

(14) In such an instance changes in the organ thus submitted are not sufficient to have any practical bearing upon the success of the procedure.

(15) The feasibility of a somewhat similar step in the human subject is questionable.

## EDITORIAL ARTICLES.

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### THE ULTIMATE RESULTS OF OPERATIONS FOR REMOVAL OF THE UTERUS OR ITS APPENDAGES.

Of the achievements of surgery during the past twenty years none have been more far-reaching in their result than those which have had to do with the uterus and its appendages.

Each organ and region of the body that has yielded successful results when subjected to surgical attack, has likewise its list of failures and limitations to be registered, which is nothing more than saying that surgery is not carpentry nor blacksmithing, that human bodies are not chemical retorts, that all the processes of life cannot be weighed or accurately calculated in any given case.

Pelvic surgery likewise is subject to limitations similar to those which attend surgical work in other parts of the body. This branch of surgery, however, presses itself upon our attention more forcibly and continually than some others, because of the frequency of the conditions which call for its intervention.

It is so recent in its growth, and its advances and triumphs have been so marked, that until quite recently the professional mind has been preoccupied with the new possibilities which each decade has been converting into actualities. The professional life of many surgeons, who count themselves still young, runs back beyond the year 1858, when Spencer Wells began his career as an ovariologist. Not longer ago than early in the seventies is it that the importance of chronic inflammatory diseases of the uterine appendages was recognized by Tait, and he entered upon his forcible and fruitful work of operating for their relief. It was in 1872 that before the Medical Society of the County of Kings, Marion Sims read a brilliant paper, in which he stated his convictions as to the role played by septicæmia in causing

deaths after ovariectomy, and made suggestions as to the use of drainage to prevent it. In the same year, John Byrne communicated to the same society his experiments in the use of the electric canterly in destroying malignant disease of the uterus. At the close of this same in 1879, Czerny, of Heidelberg, began to perform surgical hyster fruitful decade for, uterine cancer.

The decade of 1880-90 may properly be said to have been a period during which in the domain of pelvic surgery a careful testing and sifting of diagnostic significations, operative indications and technical methods has been going on. It is an omen of promise for the future that to-day on every hand surgeons are bringing together their ripened experiences, so that out of their aggregation more satisfactory conclusions may be reached as to the real benefits which the surgery of these days has to promise to those suffering from pelvic disorders.

In March, 1890, Coe, in a paper before the New York Academy of Medicine, called attention to the fact that recovery after operations for the removal of diseased uterine appendages was by no means always synonymous with restoration to health, and that in some instances sequelae were left which were more intolerable than the original conditions to relieve which the operations were performed. In April, 1891, the French Congress of Surgery devoted a session to the consideration of the Remote Results of the Removal of the Uterine Appendages, being favored with memoirs on the subject by Lawson Tait, and by Richelot. At the recent Congress of American Physicians, in September, 1891, the same theme was discussed, having been introduced by a paper on the subject by Lusk. Numerous additional communications on various aspects of this subjects have recently been made to other societies or have appeared in various medical journals. The theme is thus seen to be one of present interest, as well as of great importance.

The accepted indications which, in the view of most if not all surgeons, now justify the removal of the uterus or its appendages may be outlined as follows:

**EXTIRPATION OF THE UTERUS.**—This procedure is indicated *a*, in cases of inveterate and intractable prolapse of the uterus; *b*, in cases of intractable inversion of the uterus; *c*, in certain cases of myoma,



in which despite the energetic and intelligent use of other measures, the tumor continues to grow and causes serious disabilities or suffering from pressure effects, or provokes persistent serious hemorrhages, or undergoes cystic degeneration, or develops serious septic conditions; *d*, in cases of malignant disease of the uterus as long as the disease remains limited to the uterus itself. It should be noted that many eminent surgeons limit this indication for hysterectomy to those cases of malignant disease in which the body is invaded, while for those in which the disease is limited to the cervix, an amputation of the cervix, supravaginal by the knife, supplemented by the cautery, or by the cautery knife alone, is substituted; *e*, possibly in cases of suppurating pelvic peritonitis, in which the uterus and appendages are blended together in a mass of adhesions that cannot safely be separated when reached through an abdominal incision, and in which the removal through the vagina of the uterus by morcellement (the method of Pean and Segond) gives abundant access to multiple foci of suppuration and ensures subsequent adequate drainage.

REMOVAL OF THE APPENDAGES.—Ovarian neoplasms constituted the first established indication for removal of a diseased appendage—to this are now to be added:

- b*. Uterine myomata attended with serious menorrhagia.
- c*. Chronic and intractable inflammation of the ovary and Fallopian tube, attended with pain and disability.
- d*. Suppurative inflammation of the Fallopian tube, with retention of septic products within the distended tube.
- e*. Marked nervous disturbances, provoked by each recurrence of menstruation.

The question of primary mortality is only indirectly concerned in the present inquiry. The perfected technique of to-day, added to accumulated experience in the management of the ever-varying complications which distinguish individual cases, has reduced to very small proportions the direct danger to life of these operations when done by gentlemen who are adepts in the one and furnished with the other. Thus Tait claims to have reduced his death rate after operations for removal of the appendages to less than 3 per cent. Wylie claims a similar low mortality in his last 300 cases. Lusk lost but

2 out of 65 patients operated upon similarly. Pean reported 60 operations of hysterectomy for the relief of pelvic suppurations without a death, and Segond has reported 42 similar cases with but 4 deaths. In vaginal hysterectomy for cancer, the recent experience of a number of continental operators (Leopold, Kattenbach, Ott, Pean) shows a mortality of less than 5 per cent.; a favorable showing which is equalled by the results of Cushing, Wylie and Krug on this side of the Atlantic.

The proportion of absolute recoveries, meaning thereby the relief of the pains and disabilities of disease and restoration to a life of comfort and usefulness, is by no means so great.

Coe, in his paper already referred to, dwelt with emphasis on subsequent intra-pelvic indurations and adhesions, resulting from localized peritonitis, and causing persistent pelvic pain, uterine congestions (with or without pseudo-menstruation), vesical and intestinal disturbances, due to intestinal adhesions and cicatricial tractions. Subsequent fatal intestinal obstruction is not an unknown result of such adhesions.

Tait states that ablation of the appendages, in cases of chronic inflammatory affections thereof, often does not bring about immediate relief to pain, but adds the reassurance that this pain rarely persists for more than a twelvemonth, though for a time it may have caused much disappointment to the patient and a lot of trouble to the surgeon. Valuable observations on this point have been made by Lee, who has brought together full and accurate reports of the conditions during a period not less than five years after operation of 36 cases of removal of the appendages. In five of these cases relief from pain continued at the end of that time still quite imperfect; in four more, though the relief is considerable, notable pain still persists; in two instances it was not until after the lapse of two years that the pain was relieved; in four cases relief was obtained after one year; in six, within periods varying from two to six weeks; thus leaving only four out of the whole number in which immediate complete relief was experienced.

This persistence of pain for some time after operation accords with my own personal experience. Within the past two years I have been compelled to remove the appendages for the relief of chronic

inflammatory conditions in four instances. In two of these the adhesions were dense and extensive, making the operations complicated and severe; in two the absence of such complications rendered the operations facile; all recovered excellently from the operations, but all continue to assert that their old pain is not relieved. In two of these cases a life of constant pain had been endured for nine and twenty-two years respectively before operation. The pain habit—for there is such a thing—demands time for its abolishment in such cases; the removal of the local disease, essential and important as it is, is but the first step toward ultimate recovery. I think that I have reason to believe from the reported experience of others that ultimate relief will yet be acknowledged by all these patients. I am encouraged to this belief by the result in a case not included in the number above referred to, in which I recommend a large cysto-adenoma of the broad ligament; the enucleation of such a growth from between the layers of the broad ligament leaves behind local anatomical conditions somewhat similar to that remaining after the enucleation of adherent and distended tubes and ovaries. In the case in question not only was the ovary and tube on the side of the tumor removed with the tumor, but inspection showing that the ovary was the seat of extensive cystic degeneration it was also removed. The patient made an uncomplicated and rapid recovery from the operation, but for nearly two years thereafter she continued to complain of severe pelvic pain, apparently in the intra-pelvic cicatrix left by the ablation of the tumor. But quite recently she presented herself for examination with the agreeable intelligence that at last her pains had disappeared.

Allusion, at least, ought to be made to certain occasional sequelæ which in some cases are unavoidable, and in others are referable to defective technique, and which are likely to diminish in frequency with increase of skill in operators. I refer to herniæ forming in the cicatrix of the wound in the abdominal wall, to fistulæ from ligatures that have become infected and remain a source of suppurative inflammation within the pelvis for indefinite periods; to fecal and urinary fistulæ which in rare cases result from persistence in attempts to separate dense adhesions to intestine or bladder. Tait says that he no

longer ever permits himself to be checked from breaking adhesions by the fear of causing a rent either of the bladder or of the intestine, although in many cases he has seen to form and to persist for several months urinary and fecal fistulæ, because he has always been ultimately successful in closing such fistulæ. Whether an equal success shall attend the efforts of other operators is a matter on which testimony is yet to be accumulated. I cannot think, however, that it can ever be generally felt that rents into the intestine or bladder, complicating the enucleation of inflammatory masses within the pelvis, are not complications both formidable and to be dreaded, and that, even if immediate danger to life is averted, the remote results of consequent adhesions, undue traction, and the dangers of secondary operations, must entail much of suffering and disability and peril.

*Mental Disturbances* are undoubtedly among the possible ultimate sequelæ of the removal of the uterine appendages. How many, if any, instances of insanity, or morbid mental depression post operationem are fairly referable to the operation itself, is difficult to determine. Certainly in not a few instances some warping of the mind has already resulted from the long continued suffering which patients have undergone before being submitted to operation. In some temperaments an exaggerated idea of the damage which they have received as individuals, by the loss of their ovaries, may conduce to intensification of such mental disturbances. In most instances the lapse of time, the subsidence of pain, the improvement in general health, and the influence of reassuring advice suffices to dispel this; possibly in very exceptionable cases the unstable mind may become pushed over into confirmed insanity. Certain mental eccentricities and unevennesses of temper are accepted as the frequent natural attendants of the establishment of the menopause. Now from these nervous manifestations the artificial menopause is not free; but these disturbances are transient in their nature. Aside from these, I have been unable to find any observations which convince me that by the loss of her uterine appendages, a woman was made especially susceptible to the development of mental alienation, or to make this possible remote consequence a matter that should have any weight in determining in a given case whether the appendages should or should not be removed.

*Sterility* is, of course, a result of the loss of the uterus or of the ovaries. Perhaps a way to put it more consistent with the facts of the case is, that in the presence of the conditions in which removal of the uterus or its appendages is required as a therapeutic measure, fecundity is not restored by it. This latter way of putting it is more true to the facts in all cases except those of general neurosis, which are sometimes benefited by castration. In such cases, however, the loss of their power to procreate is not without its compensations from the view point of humanity.

*The possibilities of marital congress*, destroyed by disease, except under the penalty of great pain, are restored, as a rule, by the operations in question. The effects of the loss of the appendages upon the sexual appetite has been the subject of much inquiry. The weight of testimony seems to me to be that whatever the effects may be they are indirect, through the general changes which attend the menopause that has been induced. The lapse of some years must be required to secure the full adjustment of the economy to the changed conditions of life, whether the menopause comes in the order of nature or is induced by the surgeon. In Lee's report previously referred to, there is a systematic attempt to give the required information after the lapse of a number of years; but he has been able to obtain the needed data in only 11 cases—of these, in 8 he reports the sexual appetite to have been unaffected; in 3, to have been diminished. Here, again, in much that has been said, the subject has been approached from the wrong direction. In the cases in which a properly conservative surgeon would advise an operation the sexual appetite no longer exists; in the inflammatory cases the pain which the marital approach causes is so great as to preclude the act altogether. It would be more true to the facts to say that in the great majority of cases the ultimate effect of these operations is to restore the sexual sense to its normal condition, but that in a certain minor proportion of cases this appetite does not return. In any event, the point seems to me to be one only of curiosity, and to have no practical bearing in influencing surgical work.

*The recurrence of malignant disease after removal of the uterus or its appendages* is subject to the same laws which govern such disease

when appearing in any other part of the body. While the female breast is the most frequent seat of malignant disease of any organ or portion of the body, the uterus is nearly as susceptible, the proportions of carcinoma, according to the tables of Williams (*ANNALS OF SURGERY*, Oct., 1891), being as 6 to 7. The ovary, though rarely the seat of primary attack, is not wholly exempt—the proportion of primary ovarian to uterine carcinoma being as 1 to 60. In sarcoma, however, the proportions are reversed—comparatively rare in either the uterus or ovary—the proportions are as 12 of the ovary to 1 of the uterus. The breast, however, still exhibits the greatest susceptibility in the proportion of 50 of mammary to 1 of uterine sarcoma.

The best statistics as to the cure of malignant disease in other parts of the body are those that pertain to the lower lip and to the breast. Butlin, in his work on "*The Operative Surgery of Malignant Disease*," grants 160 survivals for three years and over, without recurrence, out of 424 patients operated upon for carcinoma of the lower lip, a rate of a little over 38 per cent. Dennis claims 30 per cent of survivals for three years and more, without recurrence, in 81 cases of carcinoma of the breast operated upon by himself. It is not probable that the operative work of the future will show any better results in surgical contests with cancer in any part of the body than is represented in the figures just given, until some remedy against the constitutional condition which underlies the development of all cancer, and which too often contributes to the development of this disease in many patients who have passed even the three-year limit, which is now generally—though in my opinion wrongly—accepted as indicative of the absoluteness which the primary local disease had been extirpated.

Careful and unbiased students must accept with much reservation any claims that are made for operations—whatever their character—for removal of malignant disease of the uterus or appendages, whose ultimate results are asserted to be better than those noted above as to the breast or lips. The careful surgical statistician of the present and of the future is compelled to exclude from all consideration in his studies and in his conclusions every case in which the character of the diseased tissue removed has not been examined and certified to by



a pathologist of recognized position. The lack of such pathological testimony requires us to reject a large proportion of the reports that have hitherto been made of the results of operative work in this field with respect to their value as data upon which to base a decision as to the method of operating most likely to secure the best ultimate results.

Equal importance, from the practical standpoints of the choice of operative methods and the ultimate results, attaches to accurate and complete statements as to the extent of the disease present in the cases submitted to this or that operation. The difficulties which attend attempts to properly compare groups of cases subjected to different methods of treatment are so insuperable, the sources of fallacy are so many, that the rational philosophical surgeon will seek rather for the data upon which to found his judgment as to the value of operative methods in his knowledge of the natural history of cancer, its methods of growth and dissemination, and well established general surgical principles.

In the treatment of cancer of the uterus the operating surgeon is continually prevented from indulging even the hope of securing any permanent ultimate good result for his patients by the state of advancement which the disease has been permitted to attain before he sees the case at all. For instance in my own experience, out of the last 20 cases of cancer of the uterus that have come under my observation, in 17 the disease had already spread manifestly into the adjacent pelvic tissues, and nothing but palliative treatment for a brief time before the inevitable death was possible.

*Of Carcinoma of the Ovary*, I have one interesting observation to record in the person of a girl of twenty-five years of age, who two years ago presented herself to me with a large solid abdominal tumor, whose upper border reached up to a point midway between the umbilicus and the xiphoid appendix. She knew it had been growing for two years, and probably longer. I operated without delay, the chief complication of the operation was an area of dense adhesions which had formed between the upper anterior surface of the tumor and the abdominal wall; the right ovary proved to be the seat of the growth, which subsequent histological examination revealed to be a carcinoma,

especially rich in cell constituents. The pathologist in submitting his report predicted a speedy recurrence. The patient made a good and prompt recovery from the operation. She resumed her work as a dressmaker, which for a period of two years since she has continued to perform. Within a few days, while preparing this article, I called upon her, found her still engaged in work about her house, cheerful and apparently unaware that there was anything serious the matter with her, but inspection revealed her anterior abdominal wall to be the seat of multiple scattered carcinomatous deposits, the most extensive being in the region of the adhesions that had previously existed with the tumor. In the left axilla was a large mass of enlarged glands.

The inevitable fate cannot be delayed many months, I think, but to the credit of the operation must be scored the more than two years of active useful life which she has since enjoyed.

*The Ultimate Effects of the Removal of the Uterine Appendages upon the Nutrition of the Uterus.* Under this head comes up for consideration the atrophic changes which are induced by the removal of the appendages. With rare exceptions, the uterus, whether hypertrophied by the presence of myomata, or in consequence of chronic inflammatory congestion, shrinks to its natural size, or possibly may undergo still greater involution. The myomatous tumors disappear, or cease to grow, menorrhagia is arrested, and an artificial menopause is induced. According to the experience of Tait the age of a patient has a marked influence upon the rapidity and course of these changes. He puts it thus, approximately :

Before the age of 40 years, 70 out of 100 tumors will disappear completely ; between 40 and 50 they may not for the most part disappear entirely, but they will diminish in size sensibly ; out of a total of 265 cases, in all but 8 the removal of the appendages brought about a complete relief to symptoms either by the complete disappearance of the tumor, or its cessation in growth, and the full checking of the menorrhagia. In the 8 exceptions subsequent hysterectomy was required.

The following personal observation illustrates happily these points :

A lady, who had been under my care for ten years or more, was the subject of a small interstitial myoma, producing obstinate menorrhagia, and accompanied with epileptiform attacks at long and irregular intervals. By repeated curettings of the uterus, and by the prolonged administration of large doses of ergot, she was kept along from year to year with the expectation that the natural menopause would bring relief to her symptoms. The age of 51 years found her with her condition in no wise ameliorated; she flowed, if anything, more copiously and continually than ever. Finally I removed her appendages. The operation was done a little more than one year ago. From that day she has lost no more blood, and what is also interesting, she has had no convulsion. Her general health is better than it has been for many years. In the cases in which the appendages are removed for the relief of chronic inflammatory conditions, the atrophic changes in the uterus are not so prompt and certain as in cases of myoma. The arrest of menstruation is sometimes delayed for months and in some cases never takes place at all,

According to GLOEVECKE (Arch. f. Gyn., 1889, Bd. 35. Hft. 1, p. 1) taking all classes of cases together menstruation is suppressed in 88 per cent. of cases; in the remaining 12 per cent. it becomes rarer and less abundant.

What is the effect on the remaining generative organs of the *extirpation of the uterus only, ovaries being preserved*? The author above referred to (GLOEVECKE) is able to answer from the observation of 14 such cases. He says that after the extirpation of the uterus the menses are always suppressed, and without ever giving rise to vicarious hemorrhages of any practical consequence. For a while after the operation the times of the usual menstrual crisis may declare themselves by vague pains and malaise in the pelvis, such as usually characterize the menstrual turmoil. The loss of the uterus appears to have no influence upon the remaining genital apparatus. The vulva, the vagina, and according to all appearance the ovaries, also remain normal. It appears certain that the function of ovulation persists intact until the occurrence of the natural climacteric.

I have thus very briefly traveled over a very wide field; my effort has been to summarise, in a condensed manner, the ultimate results, as

I have been able to gather them from the published work of others, and from my own observations, which have attended the recent major surgery of the uterus and its appendages. One cannot fail to be impressed, as the subject passes in review, with the vast possibilities of benefit which inheres in this branch of surgical work. Its limitations at the same time are clearly defined. It is no field into which one can venture with rash footsteps. Operative mutilation in any part of the body is to be deprecated, and accepted only when clear proof exists that other measures are futile. Especially should this be the case when organs are concerned which are so intimately related to the higher functions of life as are the uterus and its appendages.

But all the more forcibly does the very important character of the organs involved urge the surgeon—when once the indications for his interference are clearly established and the futility of temporizing methods are apparent—to radical and thorough work, that out of the wreck which has already been worked by disease, he may wrest as much as possible for future good.

LEWIS S. PILCHER.

## INDEX OF SURGICAL PROGRESS.

### ABDOMEN.

I. *Echinococcus* of the Liver Operated on by Costotomy. By DR. A. BRUNNICHE (Copenhagen). October 17, 1886, Th. B., a young Icelandic woman, æt. 20, entered the hospital with symptoms which apparently indicated a right-sided tuberculous pleuritis, namely, infiltration of the right apex, change in the voice, sweat, failure of the general nutrition and disturbances of digestion. Examination of the sputa was not then well in vogue in that hospital. As the patient began to have rigors and grow worse, a trial puncture was made without result. In December a greater prominence of the right hypochondrium and epigastrium was noticed, while the anterior border of the liver was felt three inches above the umbilicus. Friction sounds were audible on the right side in the fossa infrascapularis. December 13 a second trial puncture was made in the ninth right intercostal space and a small quantity of purulent fluid drawn off; this was examined under the microscope, but revealed nothing definite. As the diagnosis of empyæma was thought certain, cystotomy was performed December 15, and a six centimetre piece removed from the tenth rib in the posterior axillary line. About 1,100 grams of fœtid pus were removed which contained large yellowish and gelatinous masses as well as the remainder of a number of torn membranes which presented a distinct stratification and were studded with prominences of the size of a pea. No hooks could be found. The cavity could be felt below as a funnel-shaped hole piercing the smooth surface of the diaphragm. The patient bore the operation well. The purulent discharge diminished, but the wound could not be closed on account of the discharge of bile. The prominence of the right side decreased; several calcareous masses were removed. The patient's appetite and general condition improved, although she constantly lost

quite a quantity of bile. The cavity decreased in size, the fistula contracted, the drainage-tube was removed; the patient increased in weight and had naturally colored stools. The fistula finally closed entirely, and the patient was discharged as cured February 23, 1887. The writer cites two similar cases. Firstly, that of Krause (*Sammlung Klinischer Vorträge*, v. R. v. Volkmann, No. 325, 1888), where a young man, æt. 27, presented an echinococcus cyst situated upon the upper convex surface of the liver necessitating, on account of the upward pushing of the diaphragm, the performance of costotomy and the opening of the cyst through the diaphragm. A drainage tube was inserted and the wound preserved free from irritation or infection, although a large amount of purulent fluid was discharged. Secondly, that of James Israel, (*Verhandl. d. d. Gesellschaft f. Chirurgie*, viii, 1879, 1, p. 17), which was treated after Volkmann's method, costotomy, and as it could not be determined whether the diaphragm was adherent to the tumor the wound was tamponed with carbolized gauze for seven days, and finally an incision was made into the cyst through the diaphragm.—*Hospitals-Tideude*, No. 30, 1890.

F. H. PRITCHARD (Boston).



## REVIEWS OF BOOKS.

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A MANUAL OF OPERATIVE SURGERY. By FREDERICK TREVES, F. R. C. S. Two volumes, pp. 775. Lea Bros. & Co., Philadelphia, 1892.

Mr. Treves in this admirable manual of operative surgery has not entered at any length into questions of diagnosis and treatment, and has given little attention to historical subjects; but has in each instance practically assumed that operation has been decided upon and has then proceeded to give the various operative methods which may be employed, with a criticism of their comparative value and a detailed and careful description of each particular stage of their performance. No attempt has been made at the fullness and completeness of a system of surgery or an encyclopædia. Especial attention has been paid to the preparatory treatment of the patient and to the details of the after treatment of the case, and this is one of the most distinctive among the many excellent features of the book. The text upon which Mr. Treves bases his remarks is contained in the opening sentence, a quotation from Sir James Paget, "Never decide upon an operation, even of a trivial kind, without first examining the patient as to the risks of his life. You should examine him with at least as much care as you would for a life insurance." The author adds that as no operative procedure is absolutely without risk there should be a reasonable proportion preserved between the danger of an operation and the mortality of the disease. The general principle involved is well expressed in these remarks, "If the mortality attending ovariectomy were to be increased three-fold beyond the present percentage the operation would still be justifiable, inasmuch as the death rate in untreated cases is so high as to leave but little prospect of life. On the other hand, were the death rate of hysterectomy lower by three-fold than it is it would not sanction the performance of that operation on account of a small fibroid tumor which ceases to grow, which produces no symptoms, but which the patient as a whim is determined to be freed from."

There are also local risks which should not be forgotten. The removal of a small growth near the eye may be followed by an ectropion far worse as a deformity than the growth itself, and a trifling operation for the relief of a slight case of Dupuytren's contraction of the palmar fascia has led to sloughing of the tissues of the hand and a crippling of the limb infinitely more severe than that attending the original disease. In considering the risks depending on the condition of the patient, Mr. Treves enumerates the following factors: 1. Age. The mortality of all operations is lowest between the age of five and fifteen. In patients over forty the mortality is nearly three times as great as those under twenty. In young and healthy children the chief danger is from shock. The author concurs with Mr. Marsh in his belief that the widespread view that children bear the loss of blood badly is incorrect. If the weight of the body be taken in conjunction with the amount of blood lost he thinks it will be found that children bear hemorrhage well. As to influence of old age upon operations, Mr. Treves quotes freely from Sir James Paget's classical lectures upon this subject. 2. Sex. The author believes that the fact which appears to be shown by statistics that women bear operations better than men may be explained in that they are more tolerant of confinement to house and bed, lead less active lives, are usually more temperate and regular in their habits and owe not a little in addition to natural determination and patience. Operations during menstruation, pregnancy and lactation are considered undesirable. 3. The strength of the individual is carefully considered. Attention is called to the fact that mere robustness and muscular strength are not necessarily favorable factors from an operative standpoint, but that the individual who is the subject of chronic disease will, if he has escaped visceral changes, often do better than his stronger brother by reason of the long confinement during which his digestive processes and, indeed, all his vital functions have adjusted themselves to what the author calls the "molluscous condition." He emphasizes this point by advising rest in bed and a modified diet previous to all operations of any magnitude. 4. Obesity and plethora are not considered favorable circumstances. 5. Alcoholism is thought to contra-indicate any but the most necessary and urgent procedures. 6. Scrofulous and tuber-

culous cases, on the contrary, do well as far as speedy recovery up to a certain point is concerned, but the general experience of the profession has been that of the author apparently, who quotes Verneuil to the effect that operations upon such patients "abound in half successes, incomplete results and unfinished cures." 7. Other constitutional conditions may be grouped in two classes. (*a*) Those which have no deleterious influence so far as the operation is concerned, which would include syphilis, cancer, anæmia, rheumatism, gout, etc., and (*b*) those which strongly contra-indicate operation, such as leucocythemia, hæmophilia, scurvy, including inflammation, diabetes, visceral diseases of all sorts, and acute diseases generally. The author lays down the absolute rules that in no case should an operation on an adult be undertaken without a preliminary examination of the urine being made; and that before performing an abdominal operation it should be a matter of routine that the urine should be examined daily for not less than one week. The wisdom of this advice is undeniable, but the practical difficulties which interfere with its adoption by the busy surgeon are familiar to all of us. Many lives would be saved, however, beyond all question, if it were more generally observed than it is. The preparation of the patient is fully described and a brief but interesting account of the proper training of the surgeon follows. Mr. Treves thinks that "He may do well who is bold, but he will do better who has precise knowledge." "The least success follows the hand of the man who retains throughout an operation a speculative spirit, but depends largely for conditions and upon the fortune of events for results." "The days of the so-called 'brilliant' surgeon are over. Brilliancy, as associated with operations, will probably concern the reckless manipulations of irresponsible hands or the fortunate thrusts of the over bold." "The time is even now not long past when the surgeon would whip off a leg or remove a stone with somewhat of the fever and éclat of a conjuror who draws an unexpected rabbit from his sleeve." When he comes to the consideration of the instruments used in making a wound the mis-use of the director excites his especial reprobation, and while he admits that it is of service in certain cases, as fistula, herniotomy, etc., he believes that the art of operative surgery would greatly benefit if it were banished

entirely from the list of surgical instruments. Among the local conditions which influence primary healing, hæmostasis, the avoidance of rough sponging and irritating antiseptic solutions and the thorough obliteration of the wound cavity are emphasized. In the further treatment of the wound all credit is given to Sir Joseph Lister for "having established upon a new and scientific basis the ancient art of healing." Mr. Treves uses as a dressing sponges dusted with iodoform and held in place by absorbent wool and a firm bandage.

The section on Anæsthetics has been written by Mr. Hewett, Anæsthetist to the London Hospital. We were pleased to note the remark that "generally speaking nitrous oxide is the best anæsthetic in very brief operations, *and ether for longer cases.*"

The advantages and disadvantages of these anæsthetics and of chloroform and the A. C. E. mixture are discussed.

The whole section on the Ligature of Arteries is an admirable one and altogether the best with which we are familiar, with the exception of the chapter on that subject in Prof. Agnew's Treatise on Surgery. It is to be noted that ligature of the common iliac artery is recommended by the intra-peritoneal method through a median abdominal incision after the plan used in tying the internal iliac. In relation to the latter vessel the advantages are said to be as follows: The artery is easily and fully exposed; the needle can be passed with less risk to the vein or ureter; the operation requires but little time; the ligature can be applied accurately at the spot determined upon; the condition of the artery and the surrounding parts can be made out and the diagnosis confirmed or modified. All these seem unquestionable and the objection based on the risk of acute peritonitis has not much force at the present day.

Mr. Treves has performed the operation of removal of Meckel's ganglion five times with the result of return of neuralgia in two cases within twelve months, in another at the end of two years, and in a third at the end of three years; a fifth patient died of cancer within six months. He thinks it is questionable whether this neurectomy is of permanent value.

His method of ligating the lingual by aid of a blunt hook with which he fixes and draws outwards the digastric tendon is worthy of

special notice, as Mr. Treves is an advocate of this operation as a preliminary to excision of the tongue, and has done it on a number of occasions.

In the section on Amputation the plan which has been followed by the author includes a description of all the best methods of each amputation followed by indications for choice among them. He objects to transfixion for the reasons that the flap cannot be cut with precision; the skin is divided together with the superficial layer of muscular tissue; vessels may be transfixed or cut unduly short: much tissue at the base of the flaps escapes division and requires to be cut before the bone can be cleared for sawing. He adds "the method belongs to the past, to a period of 'brilliant' surgery, when the shrieking and terror-stricken patient was held in the amputation chair by many lusty assistants and the spectator doubtless stood by with a fob watch in his hand."

An entire chapter is devoted to the inter-scapulo-thoracic amputation which removes the upper extremity and at the same time the scapula and the outer two-thirds of the clavicle. He recommends excision of the middle third of the clavicle as the first step of the operation, followed by the formation of the flaps and the division of the tissues connecting the scapula with the trunk, no disarticulation at the shoulder joint being attempted. The early ligation of the third portion of the subclavian or first portion of the axillary renders the hemorrhage during this extensive operation much less than might be expected.

Among special amputations the value of "Chopart's" is questioned on account of the tendency to subsequent elevation of the heel. Subastragaloid amputation in which the only bone of the foot that is left behind is the astragalus, forming the summit of the stump, is described as giving a more elastic stump on account of the preservation of the ankle-joint than either Syme's or Pirogoff's amputation. Four methods of performing it are described, preference being given to the one by a heel-flap similar to that made in Syme's amputation, and to the oval method which is not markedly different. In the lower third of the leg the long posterior flap is preferred and at the middle of the leg a similar flap made by one of two different methods is

recommended. At the upper portion of the leg, at the spot described as the "place of election," that is about a hand's breath below the knee-joint, Farabœuf's operation by long external flap is the one recommended, and is thought by Mr. Treves to be a very substantial improvement on previous operations and to form a valuable addition to the resources of the surgeon.

In the treatment of ununited fractures he prefers resection with subsequent imobilization by splints or by an apparatus, to any of the more complicated methods which have been employed. He has had better results in ununited fractures of the humerus, femur, tibia and radius since he has discarded the use of the wire, which, he says, so far as the long bones are concerned, is a "delusion and a snare."

As to ununited fracture of the patella he describes Lister's methods of wiring the fragments, but offers as an alternative a plan by which Malgaigne's hooks are made to take the place of the wire, the bones having been exposed and their surfaces freshened as in the operation by wiring. He thinks there are several advantages connected with this method, including better and firmer approximation and easier withdrawal of the apparatus.

As to wiring in recent fractures he says it has not come into general use among surgeons and adds that a very satisfactory degree of success attends the ordinary and simple mode of dealing with the fracture.

Volume II opens with a section on Plastic Surgery.

The closing of the wound in operations for hare-lip by means of pins is objected to for fear of sloughing of the portions of the flaps beneath the ligature and of scarring from the pins. If the latter, however, are made of fine steel, well tempered, very slender, and are removed in forty-eight to seventy-two hours, these objections will not be found important, and the writer believes that accurate and speedy approximation can be obtained more readily by the use of pins than by the employment of sutures and with equally good results. The difference is, however, a trifling one, as in either case, owing to the well-known tendency of clean-cut wounds of the lips and face to heal by first intention, union is generally rapid and scarring insignificant.



In the section on the neck, which embodies an excellent description of tracheotomy, thyrotomy and laryngectomy, we note the absence of any allusion to intubation of the larynx in croup and diphtheria and think the value of the book will be increased by including some mention of this procedure in subsequent editions.

The section upon Abdominal Surgery is very full and satisfactory, especially as regards intestinal operations. Every known variety of intestinal suture is described, although Lembert's is preferred. In the treatment of the simplest form of fecal fistula, in which a short, straight sinus leads directly from the gut to the surface of the abdomen, Mr. Treves, after taking every precaution to render sinus and gut as nearly aseptic as possible, excises by an elliptical incision the portion of tissue containing the fistula, which is not opened. The wound of the bowel is then closed with Lembert sutures and that of the abdominal wall by the ordinary interrupted suture. In one case of this kind he succeeded in permanently closing at one sitting a fistula through which all the contents of the bowels had been passing for some time.

In hysterectomy Mr. Treves still favors ligation of the ovarian and uterine arteries. He has not noticed in the history of this operation a single case in which it appears that there would have been an insuperable difficulty in ligaturing the ovarian artery and its companion vein, and thinks that if the pedicle can be so prepared that a *serre-noeud*, or a clamp can be passed around it, it is possible to secure the uterine arteries lying in this tract of tissue. If the ovarian and uterine arteries on both sides have been secured then, so far as the teaching of anatomy goes, the main blood supply and apparently the sole blood supply of the tumor has been cut off. He thinks it safe to infer that the *serre-noeud*, while certainly an admirable apparatus which has brought hysterectomy into the region of practical surgery, is not compatible with the accepted principles of modern times and will no doubt in due course yield to other methods.

He gives litholapaxy in children full consideration and quotes with apparent approval the now well-known views of Keegan in favor of the operation. As to the probability of relapse—*i. e.*, recurrence—due to the actual retention and subsequent increase of a

fragment, (the only argument of any force against crushing as compared with cutting operations), he believes it will be very rare if the evacuator is thoroughly employed.

In the operations upon the thorax that of Estlander is carefully considered. Lannelongue's operation in the section on the brain is described under the head of craniectomy, though he notes the objection originally suggested we believe by the writer, to that term and the preference which should be given to the one now coming into more common use, namely "craniotomy."

In his description of the operation of resection of the spine in fracture, or in Pott's paralysis, he says that he has followed closely the account given by White, of Philadelphia.

The chapter on removal of the breast is an admirable one and fitly concludes this most excellent and trustworthy manual of Operative Surgery.

We have no hesitation in declaring it the best work on the subject in the English language, and indeed, in many respects, the best in any language. It cannot fail to be of the greatest use both to practical surgeons and to those general practitioners who, owing to their isolation or to other circumstances, are forced to do much of their own operative work. It contains, of course, numerous examples of the special methods of operating introduced by Mr. Treves, who is of a notably original turn of mind, many of them being positive and reliable additions to the art of surgery; but it is not for these that we feel called upon to recommend the book so strongly. It is rather for the excellent judgment displayed in the arduous task of selecting from among the thousands of varying procedures those most worthy of description; for the way in which the still more difficult task of choosing among the best of those has been accomplished; and for the simple, clear, straightforward manner in which the information thus gathered from all surgical literature has been conveyed to the reader.

The illustrations are excellent, and the typography of the work is all that could be desired.

J. WILLIAM WHITE.

THE STUDENT'S SURGERY: A Multum in Parvo. By FREDERICK JAMES GANT, F. R. C. S., Senior Surgeon to the Royal Free Hospital. Philadelphia: Lea Brothers & Co. 1890. pp. xxx-817.

SURGERY: ITS THEORY AND PRACTICE. By WILLIAM JOHNSON WALSHAM, F. R. C. S., Assistant Surgeon to St. Bartholomew's Hospital, etc. Third edition, revised and enlarged, with three hundred and eighteen illustrations. Philadelphia: P. Blakiston, Son & Co. 1891. pp. xv-748.

Both of these books are intended to be concise, practical and efficient aids to students preparing for examination, and it is from this point of view that any criticism must be considered.

In Gant's Surgery the section on General Pathology carries one back fully twelve years. It is a surprise, and hardly an agreeable one, to find the ideas throughout this portion of the work ignoring all the advances of the past two decades, and in view of the generally accepted theories of germ infection it is courageous, to say the least, for an author to pass them by without even a chance reference. Thus one is surprised to read that "the antiseptic method of treatment was devised with the view of counteracting any contaminating influence from the surrounding atmosphere—due *perhaps* (the italics are ours) to *germinal matter*."

It is suggested that the proper distinction between fistula and sinus would be the presence or absence of a pyogenic membrane.

The possibility of the presence of a bacillus as a causative factor in the production of the infective surgical diseases is ignored, and the Pasteur treatment of hydrophobia is condemned by scant praise. During thirty-six years of hospital treatment he has seen but one case. "Curative treatment will be utterly useless although it may be possible to palliate symptoms and prolong life."

A short section is devoted to the Antiseptic Method of Wound Treatment, in which the different attempts to obtain union without suppuration are detailed and a synopsis of the Listerian method of operating is given. No mention is made of the many modifications that practice has made possible. The occasional intervention of

carbolic acid poisoning is urged as objection to the adoption of the method.

It is a comfort on taking up Mr. Walsham's work to find our selves once again on solid ground and abreast of the times in Surgical Pathology. In the preface of this edition the author announces that Virchow's theory of inflammation has been adopted instead of that of Cohnheim, which was employed in the earlier issues.

We find that the bacteriological causes of inflammation and disease are treated fully and concisely and the possibility of the prevention of inflammation by the application of proper antiseptic precautions is fully discussed, while in the former work inflammation is considered not only as the certain result of an injury, but as the essential element in the establishment of the reparative processes.

In Mr. Walsham's surgery the accepted definitions of fistula and sinuses are retained. No especial attention is devoted to gunshot injuries, while in the former work they are treated exhaustively. Mr. Gant apparently has but little faith in the tubercle in surgery. It is only mentioned once in connection with bone diseases, and in his work is not considered in the portions of the work dealing with inflammation of the glands, osteo-myelitis periostitis, diseases of the joints and other regions, where at the present time tuberculous diseases are supposed by the majority of the working surgeons of the day to be potent, if not the most potent, causes of these difficulties.

In this work no mention is made of the influence of such constitutional disorders as diabetes or locomotor-ataxia in the production of perforating ulcer of the foot. Mr. Walsham on the other hand has recognized this fact.

Gant considers pain and inability in fractures as functional symptoms of equivocal value in diagnosis and mentions ecchymosis only "as a more or less bruised discoloration of the integument, owing to extravasation of blood, especially in fractures from direct violence."

The repair of fractures brings out a decided difference of opinion. Thus Gant says: "Inflammatory lymph, in small quantity, is first exuded round about the seat of fracture, rendering the cellular texture more succulent and thus producing a swelling, which, however, is partly or principally due to the blood extravasated by the

injury. After a period of inactivity, reparative or ossifying lymph begins to flow. A layer of this lymph is deposited between the fractured ends of bone, which undergoing development into fibro-cellular tissue, or perchance into cartilage, and thence in either case, into bone, restores the continuity of the fragments, forming an intermediately connecting layer of bone, an intermediate callus." This is the only callus, whether the ends be in apposition or overlap; although in the latter case the intermediate callus extends into the intervals of the displacement, so as to unite portions of bone which would otherwise be left unsupported. Neither an external nor an internal callus, therefore, is produced in the human subject, as was formerly supposed, excepting when the fractured limb or part is subjected to unusual motion during the process of repair or when the original bone is diseased. \* \* \* The lymph deposited in either of these situations speedily ossifies, this change taking place in the external callus somewhat earlier than in the internal callus, and ossification proceeds gradually above and below toward the line of fracture. The walls of the fractured ends of bone remain still longer disunited. Either callus thus placed is formed some time before the intermediate lymph begins to ossify. As to the long mooted question respecting the source of the callus, in the repair of fracture, the adjoining bone is the principal source of the new bone, callus being an outgrowth, in fact, from it; *e. g.*, between the adjoining ends of a broken tibia."

Washam describes the process as follows: "The method of union is similar to that which occurs in the healing of a wound of the soft parts by the first intention. Blood is at first extravasated between and around the fragments. Then follows a simple traumatic inflammation; the periosteum and the adjacent soft tissues, together with the medulla, become infiltrated with leucocytes, which have escaped from the vessels of the inflamed periosteum, medulla and bone, and by proliferating tissue cells derived from these parts. The inflammation subsides in a few days, leaving the fragments imbedded in a mass of soft, red, gelatinous material (granulation tissue) derived chiefly from the leucocytes and proliferated tissue cells, but according to some observers, in part, from the remains of the extravasated blood that

has not been absorbed. This granulation tissue, which is called callus, consists here, as in the union of soft parts, of small round cells, with a small amount of firm intercellular substance and delicate loops of capillaries which are derived in part from the vessels in the Haversian canals and in part from the vessels in the periosteum and adjacent soft tissues. He also defines the callus as ensheathing internal and permanent, intermediate or definite callus.

Both authors unite in advocating the simple excision of the breast in cancerous disease, not removing the axillary fat with its chain of imbedded glands unless they are felt to be enlarged. This practice is different from that generally followed by the surgeons in this vicinity, and the results of the two methods are distinctly in favor of the complete extirpation of the affected mamma and its connected axillary fat and glands.

Operations upon the brain for tumor, abscess, etc., receives little attention from Mr. Gant. This department of cerebral surgery is summed up in about a page and a half. The greater part of this space is devoted to a summary of Mr. Lucas Champonniere's cerebral localization. For methods of operating the reader is referred to the author's larger work on surgery. Still less consideration is devoted to this subject by Mr. Walsham.

The chapter devoted to diseases and injuries of the spine receives more careful treatment in the former than in the latter work, but in fractures of the spine he first advocates only such measures as will control inflammation and does not indicate the possibility of any cases being improved by operation. Mr. Walsham, on the other hand, recognizes the fact that laminectomy may be beneficial when the symptoms point to compression rather than disorganization of the spinal cord.

In closing wounds of the intestines Mr. Gant advocates the Glover's continuous suture, but describes both Lembert's and Gely's. Mr. Walsham advocates the Lembert, and says the "continuous suture formerly advised should not be used, as, if one stitch gives way, the whole will become loose, the wound gape, and extravasation occur." In abdominal section the former advocates the surgeon's taking a position between the legs of the recumbent patient, and uses flannels



wrung out of hot water to protect the intestine. It does not refer to enterectomy or intestinal anastomosis, but advises making an artificial anus.

While the latter author refers to enterectomy he has nothing to say on the other subject. Peritonitis, in the hands of Mr. Gant, is treated by topical blood-letting by means of leeches, warm fomentations and calomel and opium in pill form. Mr. Walsham advocates morphia and rest, but refers to the method of treatment by saline purgation advocated by Mr. Tait.

The former details and employs Mitchell Banks' method for the radical cure of hernia. The latter details, very briefly, Woods, Spanton and Banks' methods, but says so little about them that it is impossible to gain any practical information from the paragraph.

The operative surgery, *i. e.*, amputations, excisions, etc., are much better described in Mr. Gant's work, but the absence of an index is a serious drawback.

It cannot be said that the first work fulfills the purpose for which it was intended, *i. e.*, a safe surgical text-book for the student. Its antiquated ideas in pathology, absence of an index and incomplete discussion of many of the practical and advanced ideas, together with the omission of many of the new operations, and its constant reference to the author's "larger treatise," make it not only an inconvenient but a dangerous guide to any student coming up for examination before the Surgical Examining Boards of the present day.

The latter work, although leaving much to be desired in the way of description of operations and systematic arrangement, contains an index, is conservative in methods of treatment and fully up to the times.

SAMUEL LLOYD.

**SURGICAL BACTERIOLOGY.** By N. SENN, M. D., Ph. D., Professor of Surgery in Rush Medical College, etc. Second edition. Thoroughly revised. 8vo. 265 pages. Illustrated. Philadelphia, Lea Brothers & Co. 1891.

"Within a few years bacteriology has revolutionized surgical pathology. All wound complications, and most of the acute and chronic inflammatory lesions which come under the care of the surgeon are caused by micro-organisms; hence the necessity of a proper recogni-

tion of the importance of bacteriology as an integral part of the science and practice of modern surgery." So writes the author in the preface to the first edition of this work ; these words may be taken as the text from which the book was written.

Even within the year which elapsed between the publication of the first and the second editions so many new facts had been added to our knowledge of this branch of surgery that it was necessary to thoroughly revise the original volume and to add a number of illustrations, many of them colored plates, which form valuable supplements to the text.

The hereditary transmission of microbic disease is first discussed as regards the direct transmission, and also the transmission of an hereditary predisposition to certain diseases. The clinical evidences both for and against the direct infection of the fœtus through the placenta are set forth, and then the experimental proofs given. The results and conclusions of various authorities are quoted, and then the author's own conclusion that both forms of maternal influence exist. In a similar manner the questions of the existence of pathogenic micro-organisms in the healthy human body, the sources of bacterial infection, the localization of micro-organisms and the various processes by means of which bacteria, having once gained admission, are eliminated from the system, are considered at length. The only noteworthy omission in the consideration of localization is that of the probable identity of the bacteria of chorea, endocarditis and rheumatism to which reference is not made. An interesting chapter is devoted to the recent investigations of the antagonisms among micro-organism, especially those of erysipelas and diphtheria.

Having finished these general considerations, the author begins a more individual study of the various forms of bacteria. As introductory to these is a treatise on inflammation and suppuration, with descriptions and illustrations of the common pyogenic microbes. Then follows chapters devoted in succession to detailed accounts of the recognized germs of gangrene, septicæmia, pyæmia, erysipelas, erysipeloid, noma, tetanus, anthrax, glanders and gonorrhœa, giving in each case the characteristic appearance, action with various methods of staining, mode of culture, nutrient media preferred, and

adding excellent illustrations of those bacteria of chief surgical importance.

As would be expected, tuberculosis receives especial consideration, two long chapters being devoted to this subject. In speaking of the localization of this bacillus, Dr. Senn emphasizes Volkmann's conclusion—that "a severe trauma seldom, if ever, gives rise to tuberculosis at the seat of injury, but when tuberculosis is caused by an injury the trauma was always slight, sometimes almost insignificant." The clinical forms of tubercular infection, involving the skin, eye, ear, lymphatic glands, bones, joints, tendon sheaths, peritoneum, mouth and genital organs, are all considered, and interesting clinical illustrations are usually given under each sub-division.

Syphilis, though the specific micro-organism has not yet been isolated with certainty, is next discussed, the author believing that the disease is without doubt of bacterial origin.

Actinomycosis hominis, while not strictly due to a micro-organism, is included in the work, "as it often requires the aid of the microscope to make a differential diagnosis between this and other chronic infectious diseases characterized by the presence of granulation tissue."

The closing chapter is devoted to the alleged microbic origin of tumors, and as a result of his own researches the author concludes that "the microbic origin of malignant tumors has not only not been established but rendered improbable."

There is no claim made to originality in all of the subject matter; the book is really a systematic collection in the most concise form of such results as are published in current medical literature by the ablest workers in this field of surgical progress; and to these are added the author's own views and the results of his clinical experience and original investigations. The book is valuable to the student, but its chief value lies in the fact that such a compilation makes it possible for the busy practitioner, whose time for reading is limited and whose sources of information are often few, to become conversant with the most modern and advanced ideas in surgical pathology, which have "laid the foundation for the wonderful achievements of modern surgery."

H. P. DE FOREST.

ON THE PATHOLOGY, ETIOLOGY AND TREATMENT  
OF HIP-JOINT DISEASE IN THE LIGHT OF  
PRESENT BACTERIOLOGICAL AND OPERATIVE  
EXPERIENCE.<sup>1</sup>

BY CHARLES T. PARKES, M. D.,

OF CHICAGO.

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**P**ATHOLOGY. Following the publication, a few years since, of the experimental researches and the deductions therefrom, made by Professor Koch, of Berlin, with reference to the introduction and development of the bacillus of tuberculosis within the human body, has come the belief that hip-joint disease is directly and absolutely the result of the changes produced in the joint tissues by the irritation and growths caused by the presence of this bacillus; therefore the name of tubercular degeneration is now used to express the manifestations incidental to the presence and progress of this affection of the hip joint. It is a disease of common occurrence, and frequently leads to very great destruction of the joint elements, often having a fatal issue.

The great variety of the manifestations of the presence of the disease in the joint is dependent upon the variety of the component elements thereof, any one of which may furnish the primary focus of its onset. Hence there has been a corresponding diversity of opinion as to the tissue in which the disease exists primarily, some surgeons asserting that its frequency of commencement is first in the synovial membrane; others in the capsule; others in the ligamentum teres; and still others, constituting the largest majority, contend that its primary manifestation is in the development of a tubercular osteitis in the head of the femur or the cancellated bone tissue at the bottom of the

<sup>1</sup>This lecture was delivered by the late Professor Parkes before his class at Rush Medical College in October, 1890, six months before his death.

acetabular cavity; the same principle holding true here as elsewhere in the predominance of epiphysial affection. The examination of a large number of specimens after resection of the hip joint favors the supposition that an ostitis, resulting from the implantation and development of the bacillus tuberculosis in the cancellous tissues of the bony elements of the joint, is the starting point of this disease most frequently by far, in children at least. In adults the synovial membrane of the joint is often the first tissue to be affected, leading to distinct and regular changes, such as thickening, loss of function and tissue degeneration. Thickening, from infiltration, cell proliferation and tubercular growths; loss of function, in painful and limited motion and hyper-secretion with over distension of the joint and consequent loss of its normal landmarks; tissue degeneration, showing formation of granulations and fungus outgrowths on the internal surface of the synovial membrane and interference with local circulation, marked by whiteness of the skin covering the joint and the arborescent ramification of dilated superficial veins.

The changes in the tissues, when ostitis marks the onset of the disease, are exactly similar to those occurring in inflammation of bone from any source. These will be hyperemia, rarefaction of bone spaces, absorption of calcareous matter, softening, liquefaction; and added to these there will be the formation of a cheesy deposit, tubercles and granulation tissue. Such changes cannot occur without absolute interruption of circulation in the blood vessels of the bone itself over greater or less areas, leading to destruction of bone in small particles, termed caries, or in larger masses, termed necrosis. If necrosis results in consequence of this cutting off of the arterial supply the peculiar distribution of the arteries of the bone near their extremities quite frequently leads to the production of a triangular or cone-shaped fragment of dead bone, the base of which is directed towards the joint surface. The extent of the caries or necrosis will depend upon the degree of development of the bacilli and the changes they produce after infection, and the consequent amount of interference with the vascular supply of the bone concerned in the disease.

Such changes as we have indicated cannot occur without leading to well-marked evidences of interference with the nutrition of many tissues in the immediate neighborhood of the disease process. The cartilages of joints are dependent entirely for their nourishment upon the looped arrangement of blood vessels in the bone tissue immediately beneath them and to which they are attached; hence very soon, accompanying the bone changes, the cartilage covering the head of the femur or lining the bottom of the acetabular cavity is deprived of its nutrition, is separated from its bony attachments by the growth of granulations beneath it, and becomes necrotic; its surface, perforated here and there by the pressure of subjacent granulations, finally is loosened entirely or broken into many fragments, and its debris will be found floating in the fluid discovered in the joint when it is opened. Its condition of partial or complete destruction depends entirely upon the degree and severity of the disease or the length of time this disease has been in progress.

If the infection includes or progresses so as to attack the synovial membrane, this membrane is doubled and more in thickness; its polished surface is destroyed, and in lieu thereof is found a covering of soft, velvety granulations, sometimes present in such abundance as to constitute real fungosities. Their integrity is easily destroyed and the destruction is accompanied with profuse bleeding, a condition called by older writers fungous degeneration of joints.

Again, this synovial tissue may be necrotic in many places, rough, irregular upon the surface and dirty in appearance, according as the progression of the disease has led to greater or less disturbance of its vascular supply, and hence of its nutrition. This amount of disturbance varies from a condition which leads only to a constant over-distension of the joint with serum, either natural in color or slightly bloody, with or without flakes of lymph floating in the fluid, or to one which causes an accumulation of turbid fluid filled with the products of destructive action upon the granulations or the joint tissues. If pus infection is added to the disease already present the capsule may be filled with pus as well.



The distension of the joint with fluids quite frequently leads to rupture of the capsule at its weakest points and dissemination of its contents into surrounding parts; hence the tubercular abscesses which approach the surface gradually, showing fluctuation and pressure changes of the skin covering them, and indicating the necessity for incision.

The head of the femur presents much diversity of form as the result of the changes produced in it by the ravages of the disease; it is apt to be much softened and its substance more or less destroyed by liquefaction and absorption of its tissue, so that many times nothing but a short portion of the neck remains continuous with the shaft. If the onset of the disease be close to the epiphysial junction of the shaft, the epiphysis is not infrequently destroyed at once, is separated from all its attachments and is discharged or removed entire as a necrosed fragment.

Pathological changes similar to those already mentioned occur in the joint as the result of the commencement of the disease anywhere in the bony walls of the acetabulum; when commencing there the disease is not infrequently accompanied with a perforation of the acetabular cavity towards the pelvis, with the formation of abscesses bulging into the pelvic cavity.

The direction which the contents of the distended capsule take after its rupture is entirely accidental, and depends upon the site of the rupture in the capsule and the arrangement of the layers of fascia covering the joint and investing the soft parts into which it ruptures. Sometimes it projects upwards and forwards towards Poupert's ligament, and the fluctuating swelling there formed opens spontaneously or by incision above or below that ligament. In the latter case, usually indicating acetabular disease. Again, the pointing may be downwards and inwards at the apex of Scarpa's triangle, or outwards at the edge of the tensor vagina femoris muscle, or backwards upon the posterior surface of the thigh. I have on two occasions opened abscesses originating from hip-joint disease which showed the indications of pointing only when they reached the external condyle of the femur.

When the operation for excision of the joint is done early in the progress of the disease the pathological changes in the

joint surfaces themselves may be so slight as to be scarcely recognizable, yet a longitudinal section of the fragment removed often shows the foci of tubercular degeneration in spots of cheesy matter, also the formation of tubercles and granulation tissue with corresponding bone destruction.

A large accumulation of fluid filled with the detritus resulting from this disease may approach the surface in its progress, may be incised and its evacuated contents have much the appearance of the pus accumulation in ordinary abscesses, although noticeably white in color and cheese-like in character; yet cultures made from this fluid will fail to produce any of the different pus microbes. Still, you must remember that in the progress of this disease pus infection is particularly apt to occur with well-marked increase in the inflammatory symptoms attending the disease.

**ETIOLOGY.** The causes of the disease are, first, predisposing; second, exciting. *a*: Predisposing—heredity: A very large number of these cases furnish a history of tubercular disease in several members of the patient's immediate or remote family, so that there can be scarcely any doubt but what the special vital power which the patient receives from his progenitors has a certain influence on its occurrence. Yet it must be remembered that he who is compelled to associate with individuals already suffering from some manifestation of tubercular disease is in great danger of infection. This peculiar disposition to the occurrence of manifestations of this special disease in members of the same family is said to depend on the "tubercular diathesis." This, to me, means only that it occurs most frequently in the weakest and most debilitated individuals, hence in those least likely to resist any hurtful influence with which they may be surrounded, and who, above all, are unable to prevent the development of and the ravages incident to the presence of the bacillus of tuberculosis when once it gains entrance into the circulation and secures lodgment in the tissues of the body.

It has been proven that almost without exception the tissues found in chronic arthritis in any of the joints of the body, when subjected to microscopical research reveal the presence of this bacillus, and that these tissues upon being introduced into the body of a healthy animal lead to manifestations of tuberculosis.

The bacillus taken from the tissues of such a joint, can be grown into colonies if furnished with the proper culture medium, and when injected into the tissues of a healthy animal they will produce a like disease, so that we are bound to believe that there is a direct relation between the cause and effect—the cause being the presence of this bacillus, the effect being the manifestations of changes in the structure of the joint tissues.

Exciting cause. Trauma: Many facts seem to support the assertion that the bacilli, always found present when the disease is in a state of activity, remain latent in the system until their development is induced by the occurrence of any trauma sufficient to disturb the nutrition of the part in which the disease is to be developed, this disturbance of nutrition seemingly establishing all the conditions necessary to rapid growth of the bacilli and the development of the many changes in tissues incidental to their presence.

The hip joint and the spinal column constitute parts of the body very likely to be the seat of trauma resulting from the incessant activity and slight local injuries so often occurring in children, hence the great frequency with which the disease is found located in these portions of the body and in early life.

The diagnosis of the affection is based upon the well marked symptoms which outline its course. The consideration of these symptoms should always be preceded by careful and minute inquiry into the patient's family history. This inquiry not only furnishes the attendant with a fair estimate of the patient's vitality, but also the probable source of the infection.

Familiarity with and an acute perception of the earliest symptoms indicating the disease places the patient under the charge of the surgeon at a time when the adoption of remedial agents will often enable him to stay entirely the progress of the disease, or to control its ravages, to the extent of securing for the patient relief with only limited disarrangement of function of the joint; whereas, if left to progress to its later stages of advancement, relief, whatever the treatment adopted, must be somewhat problematic.

SYMPTOMS.—*Lameness*: Among the first symptoms to appear is lameness, beginning with a scarcely perceptible limp, perhaps not even noticeable while the child is at play, progressing

insidiously as the disease advances, to become a constant and uncontrollable condition. Early in the disease the lameness is most noticeable when the limb is first used after a night's rest, or when it has become slightly stiffened after rest, following constant use during the day. The cause of this lameness is in part the inherent tenderness of the inflamed tissue; but it is oftenest caused by the weight of the body bringing the surfaces of the joint in contact or by making pressure upon the inflamed areas of bone beneath the joint surfaces.

*Pain:* During the later stages of the disease the exquisitely sensitive joint surfaces cause the slightest movements in the joint or the support of any weight to be extremely painful. The patient involuntarily, from the very commencement of the disease, puts all of the joints of the affected extremity in a state of slight flexion in order to lessen shock of any kind transmitted through the extremity to the joint; hence he flexes the ankle, the knee and the hip; and however slight this flexion may be, if it is maintained, a limp will be the result in any attempts at walking. The greater degree of flexion the more marked the lameness, and hence this symptom becomes a valuable index to the extent of the disease.

The amount of pain complained of varies greatly in different cases. Where present from the first it is an indication that the nature of the trouble in the joint should be carefully inquired into. Yet there are many cases remarkably free from this symptom; absence of pain does not, therefore, by any means always indicate the absence of the disease. A large majority of cases at first, and sometimes throughout the entire course of the disease, refer the pain to some portion of the knee joint, especially the inner side.

When a patient suffering from the lameness already described complains of pain persistent or interrupted, referred to the inner side of the knee, suspicion is always awakened as to the likelihood of this pain in the knee being dependent upon disease in the hip joint, and induces an especially careful examination of the case. This pain is supposed to be reflex in nature and dependent upon the fact that the hip and knee joints receive their articular branches from the same nerve trunk, and the irritation

of the nerve ends distributed to the hip joint is reflected to those of the knee.

A very noticeable attendant of hip disease is the special pain termed "startling pains" or "night pains," so called by being accompanied with the sudden contractions of the muscles of the limb and the body in general, startling in the suddenness, and from the fact that they are especially apt to occur at night after the child has fallen asleep. The startling pain indicates that the disease in the joint has reached an advanced stage; has progressed at least to the point of the formation of granulations, which are exceedingly tender and sensitive. During waking hours the fixation of muscular contraction prevents movement of the joint, avoiding pressure upon these granulations but as soon as sleep relaxes these contracted muscles the joint surfaces fall together, awakening the patient by the excruciating pain produced; the patient moans and cries out with a sudden starting of the entire body; the muscles are forced into sudden contraction, and the patient again falls asleep. These symptoms recur from time to time until the disease has progressed so far that the destructive changes themselves prevent the pressure which produces the pain.

*Fixation:* Another symptom marking the presence of the disease is fixation of the joint in some abnormal position by the contraction of the muscles of the joint. This contraction of muscles in confirmed cases not unfrequently becomes contracture, with actual shortening of the muscles, and hence permanent fixation of the limb in positions of deformity. The fixation is supposed to be dependent upon reflex stimulation of the groups of muscles concerned in its production.

Many cases are accompanied with severe pain upon the slightest movement of or jar to the affected limb. The patient's attention is constantly directed to the protection of the joint from disturbance of any kind on account of the suffering caused thereby. The position of the limb is never changed without the foot of the diseased extremity being supported by the foot of the sound limb. Again, some of these patients seem to have learned that slight extension of the diseased extremity is of service in relieving the pain, and, of their own accord, they attempt to



accomplish this result by pressure in the direction of extension made by the sound foot against that of the diseased limb.

*Deformity:* The deformity first present is that of flexion, adduction and external rotation. The depression of the pelvis which accompanies this change in position of the thigh is necessary in order to bring the limbs parallel with each other during walking; it produces also an apparent lengthening of the limb.

Later in the disease the deformity present is that of flexion, adduction and internal rotation. In order to make the limbs parallel after the occurrence of this deformity the pelvis is elevated, and as a consequence there is an apparent shortening of the injured limb. This apparent lengthening and shortening of the extremity is accompanied with a corresponding depression or elevation of the anterior superior spinous process of the ilium on the diseased side, caused by means of a tilting of the pubis to one side or the other.

The lengthening is always apparent, the shortening may be either apparent or real. It is always real, although at times moderate in amount, after the destructive processes of the disease have led to a rupture of the *ligamentum teres* and partial displacement of the head of the femur from the acetabular cavity. When this ligament is destroyed the powerfully contracting muscles force the head of the bone against the upper and outer portion of the brim of the acetabulum and against the corresponding part of the capsular ligament, leading to pressure changes and necrosis at these points.

The shortening is real and extreme in cases in which the pressure against the capsular ligament destroys it and allows the head of the bone to be entirely dislocated from the acetabulum. Such extreme cases are not of frequent occurrence, but they do happen. In the case of a little boy operated upon by me not long ago, the disease had been exceptionally rapid in its progress and the deformity was extreme. Incision in that case showed that there was not only absolute dislocation of the joint, but also that the formation of a new acetabular cavity had commenced about the head in its abnormal position. The shortening is real also in all cases in which



there has been absolute destruction, softening and absorption of any considerable portion of the head of the bone.

As the limb is fixed in a position of flexion of a greater or less degree, when the knees are equally extended the thigh of the diseased side carries the pelvis forward, producing a noticeable flexion forward of the lumbar vertebræ, termed *lordosis*. This condition is found as a symptom of other diseases, such as Pott's disease, infantile paralysis or congenital dislocation of the hip joint, and hence needs careful inquiry to establish the real cause of its presence.

*Muscular Wasting*: Cases of hip joint disease seldom fail to present, in some period of their progress, the symptom of muscular atrophy, or wasting. This is, of course, partly dependent upon their want of use, yet is so extreme in degree or marked in its results that it must have other causes for its occurrence; among these is the existence of absolute atrophic changes in the muscular fibres, probably incidental to trophic disturbances resulting from nerve irritation; it leads to loss of contour in the joint and obliteration of landmarks; the gluteal muscles become flattened, the inter-gluteal fold changed in direction, and the muscles themselves become flabby.

The shortened and contracted muscles about the joint resist any motion therein, and stand out under the skin as rigid cords upon any attempt being made to change the position of the limb, any such attempt being accompanied with extreme suffering on the part of the patient.

*Swelling*: In the later stages of the disease swelling occasionally becomes a symptom for consideration; the deformity thereby induced being dependent on the accumulation of fluids upon one or another aspect of the joint, following the progress of destructive changes in the joint itself, and marking the site of the accumulation with resulting abscesses. Not infrequently these cases are accompanied with enlargement of the lymphatic glands on the anterior aspect of the joint.

*General Debility*: Cases of hip joint disease seldom progress far without displaying well marked manifestations of debility and loss of general health; the countenance carries ineffaceable evidence of suffering, and soon shows, by its pallor and by wasting of the general body, unmistakable symptoms of

faulty or insufficient assimilative powers. The appetite becomes capricious, may fail entirely, and in extreme cases is followed by great emaciation throughout the body. The entire extremity of the side diseased is much smaller than the healthy one, and the contrast is very evident upon comparison.

COMPLICATIONS.—*Abscesses*: Formation of abscesses is of frequent occurrence, as a complication of hip-joint disease, and when the attack is sudden, always indicates infection with the pus microbe as an addition to the disease already present. Their onset is accompanied with great increase of the signs of inflammatory action, as shown by high temperature, increased pain and tenderness, chills and sweats.

Reference is not here made to accumulation of purely tubercular matter and debris which may exist in considerable size without any of these symptoms, as is shown in similar accumulations occurring in different parts of the body, termed "cold abscesses."

The occurrence of the symptoms mentioned as indicating the development of acute abscesses is soon followed by fluctuation in the swelling produced, necessitating incision for the purpose of giving exit to the pus, or if left to itself it will open spontaneously and the pus be discharged. In either case after the contents are emptied, the opening remains patulous and shows little disposition to heal, although the walls of the abscess may fall together, and its cavity so far diminish in size as to leave only a long tortuous tract, termed a "sinus." The sinus will be kept open and give exit to a persistent discharge of matter in greater or less amount, because of the presence of the dead bone or other necrotic tissue in the diseased joint.

In old cases of hip-joint disease it is not unusual to find a number of minute openings discharging pus on different aspects of the limb and widely removed from the joint.

*General Tuberculosis*: A very serious and fatal complication of hip-joint disease is the occurrence of meningitis, or general tuberculosis. These complications not unfrequently are developed immediately after an operation, such as excision for the relief of the disease; the operation seemingly introducing the bacilli into the general circulation, thus acting as a direct

cause for the metastasis in the meninges or other internal organs if the body.

*Amyloid Degeneration:* Cases in which the suppurative process has been extreme or prolonged over many months, or even years, are sometimes accompanied with an amyloid degeneration of the liver and kidneys. The following case of a little girl ten years old, admirably illustrates this condition. She had suffered for several years from prolonged suppuration following tubercular degeneration of the lumbar vertebrae and right hip joint, with almost numberless sinuses traversing both sides of the body. The enlargement of the liver was so great in this case as to fill nearly the upper half of the abdominal cavity, its lower edge reaching quite to the umbilicus; the deformity produced was very remarkable and extensive. The liver in these cases usually returns to its normal condition, if by any course of treatment the suppuration can be caused to cease entirely. It is not a condition which militates against operative interference.

*Ankylosis:* Usually the fixation in disease of the hip depends only upon muscular contraction and contracture, and hence constitutes a false ankylosis, which disappears partially or completely during anæsthesia.

In many cases of prolonged existence of the disease, the head of the femur and the acetabular cavity are immovably joined together by the development of bone, forming a true ankylosis. In such cases the femur and the os innominatum move as one piece of the skeleton, and the deformity present cannot be changed in the slightest degree, even under anæsthesia without the application of force sufficient to break the bone or the performance of an osteotomy.

Both hip joints are occasionally the seat of tubercular disease at the same time or within short periods. The condition of the patient under such circumstances is truly lamentable; to walk is quite impossible even early in the manifestations of the disease, and even though treatment has stayed its progress, or quieted entirely these manifestations, the resulting deformity very often makes the act of walking a great labor. A case in point is that of a young man twenty years of age, who, when eleven

years of age became afflicted with double hip-joint disease. Both hips became ankylosed in a position slightly beyond a right-angle, and the legs crossed so that one knee was in front of the other. Locomotion was possible by throwing first one hip forward, which act carried the corresponding leg to the front; as soon as the weight of the body was on this foot the other hip was swung forward, and by this alternating, half-rotary, motion he succeeded in walking short distances. In this case an osteotomy was made on both extremities at the same time, cutting through the bone with a chisel just below the trochanter major. As soon as the bone was severed the limbs were easily extended and placed in a position of adduction and external rotation; they were kept in this position by the use of Buck's extension, and at the end of eight weeks the fractures were firmly united and his previous deformity was overcome. This case was one of old hip-joint disease, hence the deformity was flexion, adduction and internal rotation. To overcome the malposition it was required to make extreme extension, adduction and external rotation. Notwithstanding the fact that the disease had existed so long, muscular contraction offered no resistance to complete extension, not a single tendon required division, but the skin immediately over the anterior surface of the joint cracked in several places under the tension to which it was subjected.

**EXAMINATION OF THE PATIENT:** In order that a satisfactory examination shall be made, it is absolutely necessary in all cases to remove all of the patient's clothing; especially is this desirable to enable the surgeon to detect the earliest manifestations of the disease. It is scarcely necessary to claim that the earlier the disease is detected and the more promptly remedial agencies are adopted the sooner and the more certainly will relief be given to any case coming under inspection.

The minutest alteration of the joint or limb in position or contour, or in its movements, should attract attention and be made the subject of careful and exhaustive inquiry as to their cause and meaning. The absolute confidence of the patient should be secured by every means possible before and during the progress of the examination. Above all things, gentleness in examining is especially desirable. If possible avoid all movements which are likely to give rise to pain. If movements must be made likely

to induce pain the patient should be notified of that fact, so that the patient's fortitude may be aroused to bear it. By care in these matters even the youngest of patients can be subjected to a thorough examination at least sufficiently satisfactory to elicit the presence or absence of the well-known symptoms which accompany the disease.

It is necessary that the limb, in doubtful cases, should be carried through all the motions possible in the joint and to their extreme limits, and also that each motion should be compared with the corresponding one of the sound limb. In the early manifestations of the disease it is only when approaching the extreme limit of any motion under trial that the halt or evidence of partial fixation or pain will be elicited. In cases in which the disease is more advanced the changes in contour, in loss of freedom of motion and pain will be easily determined, and do not require any roughness of handling to demonstrate their existence.

The patient should always be placed on the back on a perfectly even and smooth table, with the spine held close in contact with the table. First, try whether or not the popliteal space of each limb can be brought in contact with the table without producing any curvature or lordosis of the lumbar region of the spine; if this can be done no deformity of flexion has taken place. If the deformity of flexion has commenced as soon as the popliteal space of the injured limb is brought in contact with the table there will be produced a curvature forwards of the lumbar region of the spine, because the fixation of the femur in the position of flexion compels the os innominatum to tilt forward. By relieving the pressure from the knee and allowing the back to again touch the table, the thigh will again be flexed and give the exact angle of fixation.

In the trial of all these motions the anterior superior spinous process of the ilium should be observed to ascertain whether it remains motionless during any of the movements to which the joint is subjected; it should not be influenced in the least. If motion is communicated to it during any of the trials it indicates that there is limitation from some cause or other to the special movement under inquiry. In this careful way compare adduction, abduction and rotation in the sound and diseased extremities.



In all cases in which this disease has made considerable advance the amount, extent and kind of deformity should be carefully estimated, for it is only by an accurate knowledge of each of these conditions and of the causes which produce them that one can hope to put into practice the proper remedial procedures necessary for their relief.

**PROGNOSIS.** The length of time the disease has been in existence, the amount of deformity already present, the general condition of the patient, the occurrence of suppuration are all items to carefully consider before prognosis is given; the degree of severity manifested in either or all of these conditions adds greatly to its gravity. To promise a complete cure is ever unwise, no matter how early the disease is recognized or subjected to treatment; every case is followed by some degree of deformity or debility in the joint. It should always be remembered that in cases in which treatment has been followed by seemingly perfect results, foci of tuberculosis may still remain latent in or about the joint tissues, likely to be stimulated to fresh activity by any trauma sufficient to disturb the circulation in their neighborhood; indeed this relighting of the disease not infrequently happens after cases in which complete excision has apparently relieved all sources of trouble.

**DIFFERENTIAL DIAGNOSIS.** Affections simulating hip-joint disease are not of infrequent occurrence. Among them may be mentioned superficial abscesses in any of the tissues surrounding the hip-joint. The acuteness of their onset and rapidity of progress will usually furnish valuable items leading to their recognition. Like all tubercular affections, hip-joint disease is comparatively slow in its manifestations.

Abscess under the iliac muscle gives rise to flexion and partial fixation of the joint. Psoas abscess has its previous history of spinal fixation and deformity. Pure synovitis from traumatism has a much shorter history for its development as a distinguishing peculiarity. An almost insurmountable difficulty is offered in cases of osteomyelitis affecting the epiphysis of the upper end of the femur, and the only special symptom belonging to this affection that is at all distinguishing is the remarkable suddenness of the onset of an attack of osteomyelitis with its accompanying rapid inflammatory changes.



TREATMENT—*Natural Cure.* Like all other diseases in the human body, hip-joint disease shows a tendency to limitation in its progress by the natural powers of the system. When this occurs it follows usually as the result of the suppurative process with the formation of abscesses, ulceration of their coverings, elimination of their contents and the discharge of the necrotic bone. If the destructive action of the disease is not extensive this result is accomplished by the natural powers alone, all the sinuses heal completely, the process of cicatrization destroys or isolates the cause of the disease, and the case is cured; usually with some permanent deformity resulting.

The special treatment to be adopted for the relief of any case of hip-joint disease depends upon and is regulated by the condition ascertained to be present after a careful examination of the case. In all cases absolute rest to the joint must be secured. All special appliances used have the accomplishment of this object in view. Recognizing the fact that there is an ever-present tendency to deformity, its prevention by every means at one's command constitutes also another item of consideration in any plan of treatment adopted.

If relief comes as a result of treatment it will not occur even in mild cases without many months, and perhaps years, of careful attention.

*General and Medicinal Treatment.* The general hygienic surroundings of the patient should be the best possible to obtain; abundance of fresh air and sunlight can certainly be secured, and personal cleanliness should be insisted upon. Food must be regulated according to the patient's power of assimilation—easy of digestion and rich in fats. It is the testimony of experience that all tubercular patients avoid the hydro-carbonaceous foods if allowed to have their own choice. Cod liver oil or butter administered with ale or malt are always supportive to the patient's vital powers. The dose of cod liver oil should never exceed one teaspoonful three times a day; given in larger quantities it is not absorbed and does harm. Some of the preparations of iron and the bitter tonics are found useful in many conditions of the general system accompanying the progress of the disease. The special condition of the patient will furnish the indication for their administration.

The presence of pain from any source frequently necessitates the use of some preparation of opium to subdue it; but this pain being oftenest dependent upon the pressure of the joint surfaces against each other, it will be most certainly relieved by the use of some appliance which will obviate such pressure.

During the earlier manifestations of the disease, counter-irritation over the surface of the joint by means of the application of cantharides, or heat, or cold, gives temporary relief to many of the painful symptoms accompanying its onset.

Treatment is of two kinds—conservative and operative. The conservative treatment has for its object the application of such dressings as will provide rest to the joint and at the same time overcome the already existing or prevent entirely the occurrence of the deformities which attend the disease. All of the various plans secure extension in order to keep the joint surfaces as widely separated from each other as possible, and they may be divided into portable splints and fixed apparatus. The first allows of some motion in the joint and general movement of the body, and the second secures either absolute fixation of the joint or positive confinement in the recumbent position.

The plan suggested by Hutchinson is considered by many as very efficient and particularly applicable to the treatment of the disease in its earlier stages. In it the shoe of the sound limb is raised by a sole two inches in thickness, and the patient required to use crutches; the diseased limb is thus allowed to swing free, and is prevented from coming in contact with the ground, the weight of the extremity thus acting as the extending force.

Fixation of the joint is better accomplished by the use of Thomas' splint. This consists of a band of steel a quarter of an inch thick and one inch wide and long enough to extend from the inferior angle of the scapula to a point just above the heel of the diseased limb; it is bent so as to fit accurately into all the natural curves of the body on the diseased side while the body is in the erect position. It is padded throughout its entire length and secured in position by a broad band surrounding the body, a second band surrounding the thigh, and a third one surrounding the leg towards its lower end. If now the patient is elevated by means of a thick sole on the shoe of the sound limb, and advised

to use crutches, this splint constitutes a very efficient means of fixation of the joint, the patient at the same time securing the full benefit of moderate exercise in the open air.

A third plan, adopted by many, consists in the use of some modification or other of Taylor's splint, which consists of a bar of steel made in two pieces with a ratchet attachment between them near the knee, to allow of extension. It is secured firmly at its lower end by a steel plate fastened to the sole of the shoe at its upper end, which reaches to the crest of the ilium; it is fitted to the middle of a well-padded cross bar of steel curved to correspond with the shape of the crest of the ilium. The attachment of the upper end of the splint to the cross bar is in the shape of a ball and socket joint. The extremities of the cross bar are perforated for the purpose of attachment of the perineal band, which is fitted in the crease of the perineum on the side of the diseased hip. The splint is secured to the limb by means of a well-padded band surrounding the upper part of the thigh, a second surrounding the upper part of the leg and a third fastened about the leg just above the ankle. When fastened in position along the outer side of the diseased extremity, and the perineal band in proper place, the ratchet attachment permits a considerable force of extension to be produced and at the same time allows of motion in the joint and general exercise of the body.

Thomas' splint is certainly a very satisfactory appliance to make use of for protection against injury in cases in which other treatment, which will be suggested, has led to a cessation of the manifestations of the disease, especially as a means of prevention of shock to or strain of the joint when the patient first commences to take exercise. Personally, I have had no satisfactory results follow the use of either of these appliances in anyway equal to those obtained either by the application of Buck's extension and confinement to bed, or the plaster cast and the use of crutches. Absolute fixation of the joint can be obtained by making use of the plaster cast; when used it should be so applied as to cover the entire extremity as well as the hips and body for some distance above the diseased joint. The ordinary plaster bandage, made of crinoline into the meshes of which plaster of Paris has been spread, is the best material to use. All

portions of the body covered by the plaster bandage should be thoroughly padded with cotton batting before its application, as well should the diseased limb be held in forced extension, abduction and external rotation and securely maintained in this position until the plaster has hardened. Many cases under my care have been treated satisfactorily with this appliance; deformity prevented, pain abolished and health restored.

No more efficient or satisfactory means of treatment in the majority of these cases can be instituted than that of Buck's extension. This is very simple and easily applied. It requires confinement to the bed on the back, yet I have never seen any ill effects attend its use. The most excruciating pain and the agony of night startings is almost immediately relieved after its proper application with sufficient weight. The occurrence of deformity is prevented and that already present is surely overcome. These results far outweigh the ill effects supposed to be caused by the confinement. It has been my experience, as well as that of many other surgeons, to constantly witness improvements in every way secured by the adoption of this plan of treatment. Its success is in main obtained by always making the extension in the direction of the deformity which is present. At all times during its use care should be had that the spinal column is in close contact with the bed on which the patient lies—that no lordosis is present. The shoulders also should be in contact with the bed, and the patient secured in this position by a broad bandage extending over the chest and under the arms and fastened to the bed; the head can be slightly elevated by the use of a small pillow. The bottom of the bed should be so far raised as to certainly secure the weight of the trunk as a counter extending force. Broad strips of adhesive plaster are fastened to the inner and outer sides of the diseased limb, reaching as high as the middle of the thigh and some distance below the foot; they are secured in position by the ordinary roller. The lower ends of the plaster are fastened to the ends of the usual spreader to prevent pressure on the malleoli. The rope used to carry a proper amount of weight is attached to the middle of the spreader and carried over a pulley which is already fixed in a movable upright attached to the lower end of the bed, in a direct line with the diseased extremity. The pulley should be placed at such height as to allow of the

extension being made in the direction of the existing deformity of flexion. The amount of weight used should be about one-twelfth of the entire weight of the body, and never sufficient to cause dragging pains in the groin. As the constant traction of the weight overcomes, as it surely will, muscular contraction about the hip, the pulley is lowered from time to time in accordance with the degree of improvement in the deformity of flexion until complete extension is permissible in the diseased limb without the occurrence of any lordosis.

If severe deformity of adduction be present it can be overcome by the use of the weight and pulley adjusted so as to act at a right angle with the thigh by means of a plaster band fastened around the lower end of the femur. The dressing should be kept on, or reapplied if not acting efficiently, until all pain is relieved and free motion is permissible in all directions. If the disease has progressed to any noticeable extent this result will not be secured short of one year's time.

*Operative Procedures.* First under the head of operative procedures are to be considered injections into the joint of a 10 per cent. emulsion of iodoform in glycerine. The iodoform treatment certainly possesses a remarkable curative effect upon tubercular degeneration in any of the joints in the body. In my hands it has proven more satisfactory in staying the progress of the disease and leading to a disappearance of the results and repair of its ravages than any other remedy or treatment that has been suggested. If the capsule is distended with fluid this should be emptied by the introduction into the joint of a good sized trocar, it being understood that the puncture is preceded by all the usual aseptic and antiseptic precautions with which you are familiar. After the fluid is emptied out through the canula, or its introduction has not been followed by the discharge of any fluid contents, from two to four drachms of the emulsion is thrown into the joint by means of a syringe and caused to be disseminated all over the joint surface by manipulation and free passive motion of the joint after the canula is withdrawn and the puncture opening protected by a pad of iodoform gauze. Some care must be used in the amount of force to which the weakened capsular ligament is subjected by the pressure of the distending emulsion for fear of rupturing this membrane followed



by the exit of the fluid into the surrounding cellular tissue. This can always be easily regulated by fastening a piece of soft rubber drainage tubing about four inches in length to the canula and fitting the syringe into the free end of it. As long as there is not much pressure upon the fluid it passes through the rubber tube without difficulty. As soon as the joint becomes over distended a well-marked bulb is formed in some portion of the length of the tube, the character of which is a sure indication as to the amount of pressure which is being made upon the capsule by the emulsion.

My experience has not shown any constitutional effects from this use of iodoform, except in one case, and that was a little boy brought afflicted with tubercular degeneration of both knee joints and one ankle joint. I injected all three joints at the same time, and this was followed by quite well marked evidences of iodoform poisoning, lasting over two days. After two injections all evidences of the disease have disappeared with the exception of deformity in the position from muscular contraction.

It has been asserted, upon good authority, that this injection is very satisfactory as well in cases in which the degeneration has gone so far as to lead to the formation of sinuses—a cure following its use without any other operative procedure. Even in cases so badly diseased as to be relegated to amputation, its use has been so satisfactory to me that I am ready to assert that no tubercular joint should be subjected to any open operation until a fair and exhaustive trial has been made of this emulsion of iodoform. It has not been found necessary to make the injection oftener than once in two weeks.

*Operations:* Cases are often met with presenting considerable deformity in which the surgeon is at once compelled to decide as to the advisability of forcible replacement of the limb in its normal position, especially cases in which the active processes of the disease have ceased, leaving such deformity.

Forcible replacement is not to be undertaken hastily, for the traumatism accompanying such procedure often starts the disease again with apparently increased fierceness of action. When anæsthesia proves that the fixation is neither from bony ankylosis nor severe muscular contraction, by steady and yet



quiet force the limb may be restored to its normal position. If contracture is extreme it may be necessary to practice subcutaneous division of the tendinous portions of the muscles offering greatest resistance. As soon as the limb is restored to its normal position it must be retained in that position by the application of plaster of Paris cast already described or by the use of Buck's extension. These appliances should be kept in position until all tenderness or other evidence of inflammatory action has disappeared from the joint.

In performing tenotomy about the hip-joint aseptic and antiseptic precautions should be observed, and the division of the muscles should be made through the tendinous portions, carefully avoiding all important blood vessels and nerves. Occasionally the principal obstacle to extension is produced by contracture of the fascia lata of the thigh. This fascia constitutes the main element of resistance; it should be divided by an open incision of triangular shape, the base towards Poupart's ligament and the apex towards the middle and some distance down the thigh. As the limb is extended the edges of the incision are widely separated, and this extensive wound can subsequently be closed by suturing together its lateral edges.

The formation of abscesses frequently require surgical interference, and they may either be treated by aspiration with subsequent over-distension with the iodoform emulsion already mentioned or by free open incision. If by open incision the contents are thoroughly evacuated by means of the scoop, and the cavity irrigated with a 1-3000 solution of bichloride of mercury or a solution of tincture of iodine in water strong enough to have the color of sherry and either packed with iodoform gauze to the bottom or drained with a drainage tube.

Old sinuses resulting from previous abscesses can sometimes be made to close by repeated injections of the iodoform emulsion or the injection of a 10 per cent. solution of chloride of zinc. This result is not likely to be obtained when their existence is dependent upon the presence of necrotic tissue in the diseased joint. Under such circumstances, and perhaps in the majority of cases, cure will oftenest follow the plan of laying them open freely throughout their entire length, curetting their walls, and then thoroughly scrubbing the resulting cavity with a 1-1000

solution of bichloride of mercury, after which they may either be closed by proper sutures introduced throughout the principal portion of their length to a point in close proximity to the joint, or the entire cavity packed with iodoform gauze and allowed to granulate, or closed by secondary sutures four or five days after the first operation.

Any necrotic tissue found in the joint must be removed, even to the extent of excising the remnant of the head of the bone if this is found to be totally destroyed.

In many cases the excision of the head of the bone will constitute the starting point of the operation, the full opening of the sinuses and their treatment as directed accompanying that procedure. Frequently the sinuses follow such a course in their tortuosity or depth as to endanger the large blood vessels of the thigh, thus preventing the surgeon from laying them wide open. Under such circumstances these important structures must not be injured, but the sinuses should be thoroughly curetted and rendered aseptic by the use of the antiseptic fluids recommended.

*Osteotomy:* Bony ankylosis following old hip-joint disease is not infrequently met with, either with the presence of sinuses or without any external openings leading to the joint, and requires for its relief a division of the bone, together with a tenotomy of the contracted muscles if these offer any resistance to the replacement of the limb in its normal position after the bone is divided.

The instruments necessary to perform an osteotomy are a scalpel and a key-hole saw or a mallet and chisel. The point of division of the bone may be either through the neck of the bone or through the shaft just below the great trochanter. If the key-hole saw is the instrument used for dividing the bone the external incision is short, only sufficiently long to admit of the easy entrance of this very narrow bladed saw. In this operation for the purpose of dividing the neck of the bone the scalpel is thrust through the soft parts just above and in front of the tip of the interior border of the great trochanter and carried firmly to the neck of the bone, all the tissues being freely divided in its course; after its withdrawal the saw is carried along the track thus made in front of the neck of the bone, which is sawed through from before backwards and the limb placed in a normal position.

When the saw is used to divide the trochanter major the scalpel is thrust through the soft parts directly down to the femur just in front of the edge of the tensor vaginae femoris muscle, and at a height corresponding with the contemplated line of section. After the bone is exposed by the incision with the knife the saw is introduced into the opening and carried in front and over the inner surface of the femur, and that bone is sawed through in a direction from within backwards and outwards. After the division of the bone the limb is placed in the position desired. An ordinary carpenter's chisel suffices for the purpose of dividing the bone in these cases. When the chisel is used to accomplish this result the point chosen for the severance of the bone is freely exposed by an incision with the scalpel through all the soft parts covering it. This incision should be long enough to allow of the introduction of the chisel through it to the bone surface, and then to permit the cutting edge of the chisel to be tured in a direction transverse to the long axis of the bone. The chisel is then driven through the bone in different directions by blows of the mallet until entirely severed or sufficiently weakened to be easily fractured by the application of slight extending force, after which the limb is carried into the position necessary to overcome the deformity and the wound closed by suture. If contracted muscles resist replacement of the limb to its normal position after any of these operations they must be subjected to subcutaneous division. All these operative procedures must be preceded, accompanied and followed by the most perfect attention to every detail of aseptic and antiseptic preparation, care and treatment of the parts operated on, of the wound and of the subsequent dressing.

Excision of the hip joint for tubercular disease thereof is an operation frequently performed and sometimes followed by lasting relief to the patient with a very useful limb. When performed very early in the manifestations of the disease before much destruction has resulted from its action, the operation is promptly recovered from and the limb possesses correspondingly greater usefulness; but even when done thus early the operation does not always secure permanent relief from the disease, for many such cases have subsequently come under my care for the treatment of tubercular abscesses, persistent sinuses re-forming

in the course of the scar, or developing in some previously unaffected portion of the joint tissues. If excision is to be followed by the longest periods of relief from disease and to secure the most useful limb, it must be done before the ravages of the disease have led to any extensive destruction of the joint elements; when done thus early the operation can be made an absolutely aseptic one, and be followed by rapid primary union of all the tissues incised with scarcely any constitutional reaction. Although many times remarkably rapid recoveries follow excision of the head of the bone, accompanied with the removal of the diseased acetabular cavity and other tubercular tissues, even after suppuration has occurred with resulting sinuses, still the probabilities of a successful and satisfactory result are greatly diminished by the presence of any such complications; the operation is far less likely to be aseptic on account of the almost insurmountable difficulties attending the purification of the sinuses and the uncertainty of complete removal of all tubercular foci. It is my belief that the persistent use of the iodoform emulsion in these bad cases will make them much more amenable to successful treatment in the future. The instruments necessary to perform excision of the hip-joint are a scalpel, probe pointed bistoury, one pair of dissecting forceps, one pair of heavy scissors, two retracting hooks, half a dozen artery forceps, a periostome, a chain saw or a straight saw with a movable back, or a chisel and mallet and needles with silk or catgut for application of ligatures or sutures. It is always well to have a Paquelin cautery ready for use in case it is desirable to destroy any tubercular tissue which cannot be otherwise removed. No better incision for exposing the joint can be made than the ordinary straight one or one made with a slight curve backwards over the situation of the trochanter major. The incision should commence at a point about two inches above the middle of the upper border of the trochanter major and terminate about an inch below the junction of the trochanter with the shaft of the femur; it should be carried with a free hand through the gluteus maximus muscle and through the periosteum of the exposed trochanter. The deeper portion of the incision should be inclined forward to correspond with the forward and inward direction of the neck of the bone; divide

the capsule of the joint and uncover the neck and head. If the disease has not made much advance, by means of the elevator the periosteum should be stripped off from the trochanter in all directions, carrying with it its muscular attachments, and in this way bring into plain view all portions of the neck, head and trochanter. In all cases it is the rule to carefully save every particle of the periosteum unaffected with tubercular degeneration, as by this means are preserved the muscular insertions and a much stronger and more useful limb insured.

In many cases the disease has so far progressed in its infiltration and destruction of the surrounding soft parts that it will be necessary to divide the muscles attached to the trochanter by means of the probe pointed bistoury in order to surely remove all the diseased tissues. It is best not to make any effort to extrude the head of the bone through the incision until after the trochanter has been perfectly freed and the capsule entirely separated by one or other of the plans just described. As soon as this is accomplished the head of the bone is readily forced through into the external incision by forcible adduction and backward pressure, using the thigh as a lever. The diseased bone is now separated from the shaft by the use of either of the saws mentioned or the chisel and mallet. My preference is given to the use of the chisel and mallet for this purpose, for with them it is possible to regulate accurately the amount of bone removed and accomplish its removal without any injury to the surrounding soft parts. In advanced cases it will usually be found necessary to include the trochanter major in the segment of the bone removed. In very early cases it may be found permissible to remove only the head and neck, and this can sometimes be done without any disturbance of the tissues attached to the trochanter major. There is considerable danger of fracturing the weakened shaft of the femur during efforts at extrusion of the head of the bone unless all of its attachments have been loosened before any such attempts are made. This fracture has occurred so often during these attempts that many surgeons advise and practice the plan of dividing the bone *in situ* without any efforts at extrusion, lifting the diseased fragment out of its bed after its severance is accomplished.

After the removal of the segment of bone the acetabulum should be examined for evidences of disease. Any granulations found present should be removed by means of the scissors or curette, and if the capsule of the joint is affected with tubercular degeneration it should be dissected away in part or in whole in accordance with the degree of degeneration present. Sometimes the destruction of manifest tubercular degeneration of the soft parts can be best accomplished by the free use of the Paquelin cautery.

If any arteries are divided during the incisions described they are temporarily controlled with the artery forceps and permanently secured by the application of ligatures.

The limb is placed in a position of extension with slight adduction and external rotation. If the case is an old one the sinuses are treated as has already been described, and the wound thoroughly irrigated with a solution of 1-2000 bichloride of mercury or the solution of tincture of iodine in water. The external wound can be treated in either of two ways. It may be packed throughout to the bottom with iodoform gauze and partially closed by a suture, or it may be closed entirely by sutures, except at the point used for the exit of large drainage tubes, introduced in such position as will provide for free outflow of the wound secretions.

If the case be a very bad one with many sinuses and much suppurative action I prefer the treatment by iodoform gauze packing, permitting the wound to heal from the bottom by granulation, or applying secondary sutures, to be tied about the fifth day, upon removing the packing.

In either case the usual external antiseptic dressings are applied and the limb maintained firmly in its normal position by the application, outside of the dressing, of the plaster cast or the use of Buck's extension. The necessity for subsequent dressings of the wound will depend entirely upon the presence of disturbance therein, as indicated by the rise in temperature—the less often disturbed the better. The external appliances for maintaining the limb in its new position should be retained for sometime after the wounds have entirely healed, and the use of the limb forbidden until all tenderness at the seat of the opera-



tion has disappeared. It is advisable to apply Buck's extension at night for at least one year after the wound is healed.

The indications for hygienic and medical treatment, such as have already been advised, should be assiduously fulfilled throughout the entire course of treatment.

*Results of the Operation:* After excision this extremity is always considerably shortened, and if the head, neck and trochanter have been excised the parts remaining are not such as to result in the formation of a very serviceable joint. Besides, if the destructive action be so great as to require such an extensive excision, the parts concerned are very slow in healing, and oftentimes the resulting sinuses never heal at all or remain open for years. Occasionally, owing to the continuation and extension of the disease, an unseemly deformity produces an absolutely useless limb. It is certainly a question whether the majority of limbs after excision are as serviceable to the patient as the attainment of ankylosis of the joint, with the limb in the extended position. It is even advisable to maintain extension for a year after all symptoms of acute trouble have disappeared in order to allow of complete condensation of cicatricial tissue, to diminish the degree of shortening, to avoid deformity and to provide for firm fixation of the shaft of the femur in its new position. This result can be accomplished by the use of Buck's extension with sufficient weight during the night, allowing the patient to take the usual amount of exercise during the day time.

*Amputation:* Cases which have been subjected to little or no treatment and which have been allowed to progress for years, with the extension of the disease to the os innominatum and shaft of the femur, and accompanied with much burrowing of pus, should be subjected to amputation of the hip-joint. With the improved methods to absolutely control hemorrhage, and the present technique of the operation, amputation for the relief of this disease is not attended with more, if as great, mortality as excision. It promises most relief because it removes the mass of the diseased tissue and allows of free and perfect drainage, and furnishes a ready method of accurate application of remedial measures to the remaining evidences of disease. Best of all an amputation puts a stop at once to the immense drain put upon

the constitutional power of the patient, resulting from an extensive suppurating cavity.

Amputation of the hip-joint will be required in some cases as a secondary measure for deformity after excision, or for the relief of such cases as are not followed by satisfactory cicatrization of the cavity left and the closure of the accompanying sinuses.

Amputation is best made after the plan of Mr. Furneaux Jordan. It consists in making a circular amputation of the thigh at a proper distance below the hip-joint. After the circular amputation is completed the blood vessels are permanently secured with ligature; the remnant of bone left is then dissected out of the stump through an incision carried from the top of the trochanter major to the end of the fragment, along its outer side.

The bleeding vessels are positively and absolutely controlled by carrying a rubber band across the perineum and over the pubis in front, and behind the trochanter and over the crest of the ilium posteriorly. The rubber is pulled as tight as possible and the ends crossed where they meet above the crest of the ilium and then carried to the opposite side of the body and securely held by an assistant. A firm pad is placed beneath the rubber across the course of the external iliac artery in such position as to actually close that vessel; it should be held securely in proper position by an assistant. Or the plan advised by Dr. Wyeth can be followed with perfect safety—pass an upholsterer's long needle through the soft tissue on the inner side of the thigh on a level with the lesser trochanter; a similar needle is carried through the tissues on the outer side of the thigh, between the trochanter major and the ilium. The needles should be long enough to project at least two inches beyond the soft parts at both ends; protect the points of both needles with a piece of cork. Encircle the thigh above the pins with a sufficient number of turns of a rubber bandage to control all the vessels. The circular amputation of the thigh is now made, first forming a skin flap which is to be turned up as far as possible; then a circular division is made of the muscles as high up as the knife can safely be carried, and the bone sawed through. All vessels are now permanently ligated, the rubber band removed and the rem-

nant of bone dissected out of the stump. No blood whatever will be lost while the rubber band remains in position, if either of the above methods are properly executed. In my experience rapid and unexpected recoveries have followed amputation of the hip-joint for bad cases of hip-joint disease.

## TREATMENT OF COMPOUND FRACTURES.<sup>1</sup>

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IN no class of accidents is the influence of antiseptic treatment more apparent than in compound fractures. Before the antiseptic period the mortality in these accidents from septicemia, pyemia and erysipelas was simply frightful. No prognosis could be given in a single case, not even in a simple puncture of the skin. Bilioth gave in gunshot fractures a mortality of 60 per cent. for the femur, 24 per cent. for the leg below the knee.

But in civil hospitals the results were even worse. Volkmann lost 25 of 104 cases of compound fractures from gunshot wounds at Trantenau, viz.: 24 per cent; but 26 of 64 compound fractures of the leg in the hospital in Halle in peace, viz.: 40 per cent., and yet a great many were simple punctures of the skin.

Of 885 cases of compound fractures of the leg below the knee collected from different sources 339 died, viz.: 38 per cent., while the mortality in war was but 24 per cent.

This was the general rule and not characteristic for one hospital. Baum, in Gottingen, had 38 per cent. mortality.

Bilioth in Zurich had 38.7 per cent. mortality;

Clinic in Breslau had 40.5 per cent. mortality;

Clinic in Halle had 40.6 per cent. mortality;

Clinic in Bonn had 41.8 per cent. mortality;

Luke in Berne had 38 per cent. mortality;

I am informed from credible sources that at the Buffalo General Hospital shortly before 1880 16 consecutive cases of compound fracture of the leg terminated fatally.

It is scarcely to be wondered at that with such general results Volkmann's paper on the treatment of complicated fractures in

<sup>1</sup>Read before the New York State Medical Society in Albany, February, 1892.

1877 occasioned the greatest astonishment. He reported 75 cases of which 8 were amputated secondarily, but all 75 recovered. Of these 75 cases, 43 had fracture of the leg below the knee, of which one was amputated. Volkmann's method was as follows:

The wound was dilated with the knife in every case so that a finger could be introduced and the fracture seen and felt. The wound was thereafter thoroughly disinfected with carbolic acid solution, all coagula being removed. All pockets under the skin were opened freely in order to drain them, and a number of incisions were made, particularly where the skin was torn loose from the fascia in order to remove the blood and introduce drains so that the skin might adhere again by first intention.

Badly crushed parts of muscles were occasionally removed. The fracture was thereafter disinfected, if necessary through a new incision. All loose splinters were removed while those attached to the periosteum were left in situ. Sharp bone-points were removed with bone scissors. After repeated irrigation a number of short drainage tubes were introduced vertically, the wounds sutured and an antiseptic bandage and lateral splints applied. The first dressing decided the fate of the patient.

The whole dressing was removed in all severe cases inside 25 or 48 hours in order to satisfy him that everything was all right, and thereafter regularly every second, fourth, or sixth day till no secretion appeared any more and till the blood coagula had been substituted by granulations. The drains were then removed and a permanent plaster of Paris bandage applied. The method was, although successful, quite laborious.

It is now fifteen years ago since Volkmann's paper appeared. It ought to have revolutionized the teachings of the treatment of compound fractures, and yet has it done so? We need only to take any one of the numerous text books on surgery in the English language and we will in almost all find the following recommendations: If a mere puncture is present seal it up with collodium or compound tincture of benzoin.

If suppurations occur incise and treat on general principles. If there is a large wound and lacerated edges, syringe it out with strong antiseptics, insert drainage tubes, apply antiseptic bandages and splints.

If the bone is comminuted remove loose splinters, saw off projecting edges, wire the fragments and treat on general principles. In severe compound fractures with extensive lacerations of soft tissues, ruptures of large arteries and nerves and opening of large joints, amputate.

For several years I have employed a uniform and more radical method in dealing with this class of accidents, and the results have been as encouraging as the method is logical. A compound fracture is simply a contused and lacerated wound, as little inclined to heal by first intention as any other contused and lacerated wound, not to mention that the wound is often, even in simple punctures, filled with dirt, the sharp ends of the bones having gone through the clothing and into the ground. I have rarely examined such a wound without finding foreign particles in it.

To seal such a wound with collodium is as unscientific as it is dangerous, even if it occasionally heals without any accident occurring.

I have therefore in every case of compound fracture for several years endeavored to change the contused and lacerated wound into a simple incised wound in which I confidently might expect healing by first intention.

On admittance to the Sister of Charity Hospital a patient with a compound fracture of the leg or any other place is invariably anesthetized, and the leg then as thoroughly disinfected as can be done with soap, brush, razor and corrosive sublimate. The wound, even if a simple puncture, is thereafter freely incised, an Esmarch's bandage having been previously applied. All crushed and lacerated or with blood suffused and suspicious looking tissues are thereafter thoroughly removed with curved scissors, and that whether they be parts of skin, subcutaneous tissue, fascia or muscle; I prefer to take away too much rather than to leave anything suspicious behind. Every pocket is opened along its whole length and treated in the same way. If deepseated pockets be found between the muscles, large openings are made in the most convenient spot in order to deal intelligently with them. Loose splinters are removed, and if the fracture is severe or comminuted the ends of the bones are forced out through the wounds, thoroughly cleaned and the blood clots



removed between and behind them. Sharp points are removed with bone scissors, and in comminuted fractures the bone-ends occasionally sawed off transversely. I quite often have found loose splinters and even foreign particles behind the bone-ends.

The Esmarch's bandage is thereafter removed in order to find and ligate bleeding arteries, and then reapplied. The wound having been thoroughly disinfected with corrosive sublimate (1-2000) and the fractured bones having been brought into apposition and carefully held there by the principal assistant, the different wounds are closed with catgut sutures with the exception of about  $\frac{1}{2}$  inch in each wound, which is left open for drainage. A strict antiseptic bandage is thereafter applied, and this covered with a plaster of Paris bandage, taking in both the knee and the foot. The Esmarch's bandage is finally removed and the wound allowed to fill with aseptic blood.

I have in no case used any silver wires or drainage tubes both of which not only are superfluous, but necessitate the disturbance of the dressing and thereby may interfere with the healing process.

The first dressing I allow to stay on undisturbed for four to six weeks, according to the severity of the fracture, and, when then removed, I have in every case found a perfectly healed wound without a trace of pus. If the fracture is not then perfectly consolidated I reapply the plaster dressing.

I have during the last three years treated eleven cases of compound fractures of tibia and fibula in this way, most of which were very severe. One died of delirium tremens on the sixth day, but the wound was found perfectly aseptic. One was amputated on the third day on account of gangrene, but recovered, and nine recovered without any complications, such as necrosis, osteomyelitis, suppurations, etc., the wound in every case healing without a trace of pus.

I could with the greatest ease double or triple this little statistic if I would add compound fractures of other long bones and acute resections of joints on account of injuries. The result has in every case been the same—a perfectly aseptic course with a minimum of discomfort to the patient.

Is it not then about time to re-write the chapter on the treatment of compound fractures? I add a little statistic of

eleven cases, giving in each case the age, cause, condition on admission and result. It is valuable particularly in showing the uniformity of results in the most different degrees of lesion and in different ages.

I have treated successfully in this way fractures on account of which I formerly without hesitation should have amputated, and I have very greatly modified my ideas of what is an indication for primary amputation. Let me, as an example, mention more fully case No. 11, in which I had the opportunity of examining the wound on the sixth day, the patient then dying of delirium tremens.

P. F., age twenty-one, was brought on November 30, 1891, to the Sisters of Charity Hospital with the following history: eighteen hours previously, while blasting in the Niagara tunnel, a large rock weighing several tons fell, striking him on the right leg in the lower third and producing a compound and comminuted fracture of both tibia and fibula and extensive lacerations of the soft parts. On examination at the hospital two large lacerated wounds were seen, one on the anterior surface, through which bone protruded, and one behind, extending well up on the calf. Both wounds were filled with numerous particles of stone, some as large as beans, and earth. Under ether-narcosis the wounds were freely enlarged and a third incision made over the fibula. Ten large splinters were removed, leaving a gap about two inches long between the ends of the bones.

The bone-ends were thereafter protruded through the wounds and sawed off transversely. At the point of fracture the bellies of all the muscles except peroneus longus, tibialis anticus and soleus were found torn across and pulpified for several inches. The crushed parts were removed with scissors, also all lacerated subcutaneous tissues and parts of the skin.

The posterior tibial artery was found ruptured and was doubly ligated. The foot was then held in place by the skin, the three muscles mentioned and the anterior tibial artery. The condition of the nerves was not ascertained. The wound was thereafter thoroughly irrigated, the incisions sutured with cat-gut in the way mentioned previously, the foot pushed upwards to approximate the bone-ends and held carefully in place while antiseptic dressing and a plaster of Paris bandage were applied. By measurement there was then fully two inches shortening. Moderate surgical fever followed, but the toes were warm and the patient comfortable till December 4th, when he

was attacked by delirium tremens, to which he succumbed on December 6th.

The dressings were found perfectly sweet, without a trace of pus, and the wounds in the skin entirely agglutinated or healed. A blood clot was found organized around the bone-ends and between the severed muscles, and the whole condition gave every evidence that the final result would have been favorable if he had not died of delirium.

Case No.	Entered	Name	Age	Occupation	Condition and Cause	Result
1.	Nov. 8, 1888.	John Meyer.	65	Tramp.	Struck by railroad train. Lacerated wound of middle-third of leg, protruding bone-ends, oblique fracture with several loose fragments. Wound full of dirt and coal dust. Soft tissues badly lacerated.	No rise of temperature. Feb. 15, 1889, dressing changed. They were dry and no pus. Wound healed. Some looseness of fracture, why plaster dressing was re-applied. April 15, 1889, discharged cured.
2.	Jan. 10, 1889.	Timothy Cronin.	28	Printer.	Slipped on icy street and sustained compound fracture of both bones of right leg at junction of middle and lower third. Fracture oblique and bones protruding on anterior surface. Soft tissue badly crushed and lacerated.	Jan. 11, 1889, toes cold, bandage loosened Jan. 13th no return of circulation, gangrene. Amputation below knee. Made a good recovery.
3.	Oct. 9, 1890.	E. Clifford.	24	Carpenter.	Fell 15 feet from a ladder, producing compound fracture of both bones of left leg in lower third. Upper fragment protruding $\frac{3}{4}$ of an inch, wound full of dirt, soft tissue and muscular tissue badly lacerated.	Temperature on second day 101, Third day normal. Discharged December 5th, no deformity.
4.	Mar. 20, 1890.	Pat Kelly.	24	Carpenter.	Fell from scaffold, compound fracture near ankle joint. Several pieces of bone remained.	Discharged April 27th, 1891, recovered.
5.	Oct. 20, 1890.	John Getticker.	45	Huckster.	Was thrown from his wagon, fracturing both legs. Simple fracture of left leg, compound fracture of right leg in middle third. Fracture oblique, punctured wound on inner aspect of leg.	No rise of temperature. Discharged April 27th. Recovered.
6.	Feb. 28, 1890.	C. Mayor.	24	Unknown.	Fell on icy sidewalk. Punctured wound on anterior surface of left leg, oblique fracture.	No rise of temperature. May 7th wound healed, but fracture still loose. July 25th discharged recovered.

Case No.	Entered	Name	Age	Occupation	Condition and Cause	Result
7.	Sept. 18, 1891.	S. Eastman.	30	Brakeman	Struck by engine, compound transverse fracture of tibia and fibula in middle third of left leg. Bones overlapping fully an inch. Punctured wound on inner surface of large incision was made in order to reduce the fracture, it being impossible to do so by extension alone. A great deal of crushed tissue and pulvified muscle was cut away. Sharp edges of bone cut off.	Temperature on second day 100, thereafter normal. October 24th wound healed without pus, fracture still loose. November 26th, still some looseness. The callous severely manipulated and plaster re-applied.
8.	Sept. 30, 1891.	Fred Ullman.	9	Schoolboy.	Fell under cars. Right leg crushed to a pulp in middle third, in left leg a badly compounded fracture between middle and lower third. Right leg amputated below knee joint. On left leg soft parts badly crushed, punctured wound on inner surface, through which upper fragmen protruded.	No rise of temperature. Discharged recovered November 18th.
9.	Nov. 6, 1891.	James Thomas.	40	Miner. (Colored.)	Struck in the Niagara tunnel by a large rock on left leg on day before. Compound fracture of tibia and fibula in the middle, fracture oblique, with ends of lower fragmina protruding through the skin.	No rise of temperature. December 20th wound healed, but some looseness of fracture. Plaster dressing re-applied. Is still in hospital.
10.	Nov. 10, 1891.	Mrs. Whistling	47	Housewife.	Thrown from a wagon 18 hours previously and received a compound fracture between middle and lower third of leg. No splint on when received. Large ragged wound over anterior and inner surface, through which the lower fragmen protruded for an inch. The anterior tibial muscle was caught between the bone-ends. Behind the upper fragmen, which was made to protrude, a large bone fragment, one inch long, was removed.	No rise of temperature. Discharged to her home December 26th. Still some looseness at that time, why plaster cast was re-applied.
11.	Nov. 30, 1891.	Pat Flaherty.	21	Miner.	Injured at Niagara tunnel by blasting, on November 28th, producing comminuted and compound fracture of the tibia and fibula and diffuse laceration of skin, subcutaneous tissue, muscles and rupture of posterior tibial artery. Wound filled with dirt and particles of stone. Ten large splinters removed, leaving a gap of two inches between the bones. The bellies of all the muscles except tibialis ant., peroneus longus, and soleus pulvified for several inches, and removed art. tibialis post. doubly ligated.	Died on 6th day of delirium tremens. All wounds found agglutinated or healed; a large organized blood clot was found between the bones and muscles. Not a trace of pus.

NEPHROTOMY FOR THE RELIEF OF SUDDEN  
TOTAL SUPPRESSION OF URINE OCCUR-  
RING SOME TIME AFTER  
NEPHRECTOMY.<sup>1</sup>

[WITH THE REPORT OF A SUCCESSFUL CASE.]

By WILLY MEYER, M. D.,  
OF NEW YORK.

ATTENDING SURGEON TO THE GERMAN AND NEW YORK SKIN AND  
CANCER HOSPITALS.

IT has been my good fortune to perform so far extirpation of a diseased kidney six times (from October, 1890, to October, 1891), and not to have lost any of the patients. They are all in good health to-day and enjoy life. To go here over their histories would lead me too far, although every one of them contains some points of interest. One of the six cases, however, is so comparatively rare, and the result of prompt operative interference so extremely gratifying, that I think it worthy to be reported.

Miss R. G., 28 years of age, had always been healthy until 1890, when she was seized with a full, oppressing feeling and some pain in her right hypochondriac region. The pain increased for about two hours, then it suddenly ceased. Similar attacks recurred at intervals of six to eight weeks. She consulted her family physician, Dr. A. M. Lesser, of New York city; but the most careful examination failed to detect anything abnormal. There was no fever, feces were colored, urine normal. In December, 1890, a similar attack set in; this time, however, with considerable rise of temperature and general distress. Patient had to stay in bed for nearly one week. This time a small tumor could be felt below the border of the right ribs and close to the outer border of the right rectus muscle. It suddenly disappeared on the fifth day, leaving no trace behind. It could not be made out whether during these attacks the secretion of urine had been scarce, and whether coincident with the sudden improvement

<sup>1</sup>Read before the Medical Society of the State of New York at its eighty-sixth annual meeting, Albany, February 2, 1892.

an abnormally large amount had been voided. The patient felt entirely well for nearly four weeks, when the trouble recurred in a more serious form for the third time, also with considerable fever, local, great sensitiveness and general malaise. An eminent physician was called in for consultation, who diagnosticated cholelithiasis, and advised, in view of the frequently recurring attacks, operative interference. When I saw the patient with Dr. Lesser, on January 30, 1891, I could not but concur with the two gentlemen's diagnosis. There was a tumor of about the size of a fist palpable below the border of the right ribs, between the anterior axillary and the median line, the greatest prominence corresponding to the outer border of the right rectus muscle. At this spot the hand, gently placed upon the abdominal wall, felt a soft crepitation, and created pain on pressure. Gentle bimanual palpation seemed to reveal a movable growth, which reached so close to the surface, however, and was so prominent anteriorly, also left the lumbar region of the same side so comparatively flat, that it did not impress me, at all as being of renal origin. Moreover, the patient had a yellowish-pale color and the urine was normal. I therefore abstained from inflating the colon or tapping the tumor, and was also inclined to attribute the symptoms to cholelithiasis, with one or more gall stones impacted in the cystic duct, which did not entirely block its lumen. Only now and then, so I calculated, did such stones entirely occlude the duct, and then the occlusion was due less to the size of the stone than to active contraction of the muscular coat of the duct around it. I advised the continuance of the treatment—small doses of morphine and ice-bag—and operation as soon as the inflammatory symptoms should have subsided. Twelve days later Dr. L. called on me, stating that the pain and fever had lessened, the size of the swelling was not materially increased, and that the patient was now ready for the operation for biliary calculus. I did not see the patient again until the day of the operation—February 12th—when bimanual palpation of the patient for the first time under ether led me to modify my original diagnosis, for now the tumor rather seemed to originate from the kidney than from the gall-bladder. Still, I opened the abdomen outside of the rectus muscle, and was not greatly surprised to find that the tumor was really retro-peritoneal. The pre-renal peritoneal fold was greatly hyperæmic, but there were no adhesions. The wound was sewed up at once with silk-worm gut. Two sutures in the middle of the incision, which corresponded to the greatest convexity of the tumor, had to be very snugly tied in order to bring the divided tissues into proper apposition. I purposely did not add a retro-peritoneal operation at once, as nephrectomy, not



only nephrotomy, might be indicated. And for this I wanted the patient to be properly prepared. I also wanted to perform cystoscopy first, in order to determine the excreting power of the other kidney. For if my aspirator should draw a transparent fluid from the swelling simple inspection of the urine would not suffice to enable me to estimate the condition of the companion gland. If, however, pus should be found cystoscopy would not be necessary, for I could at once infer that the opposite kidney was in good working order and excreting all the urine that was passed; for this was perfectly clear, which fact would point to an occlusion of the right ureter, preventing any descent of fluid from a purulent kidney.

Temperature was slightly raised in the first two days after the initial operation but did not exceed 100.5. Otherwise no reaction followed. The patient only complained of some pain in the line of incision. Stitches were removed on the eighth day, when the wound had healed by primary union throughout.

Twelve days later Dr. L. notified me that the middle of the wound had reopened and gave a continuous exit to a large amount of flocculent pus. Evidently the two silk worm gut sutures in the middle of the wound, which could only be tied with some difficulty at the time of the operation, had made a local pressure necrosis on the sac which, once started, was rendered complete by the presence of purulent fluid in the renal tumor. Meanwhile adhesions had formed within the prerenal fold, so that none of the pus entered the peritoneal cavity. No drainage tube was introduced. The wound was loosely covered with an antiseptic moist gauze dressing. As the symptoms due to distension of the kidney were now relieved by this spontaneous perforation of the sac, there was no urgency for immediate interference, and we used the next weeks to build up the patient. Cystoscopy was not now needed to test the functions of the opposite kidney, as all the secretions of the diseased gland passed through the fistulous opening in the abdomen, and the clear urine which continued to pass per urethram in normal quantity and quality, was evidently secreted by the kidney of the opposite side.

On March 19 nephrectomy was done with the help of an incision parallel to the border of the twelfth rib, to which later a short second one, passing from nearly its middle at right-angles, was added. I nicely succeeded in peeling off the sac from the opening in the abdominal wall as well as from the perirenal peritoneum which appeared extremely thin over the whole area. Then the ureter was first divided separately. As usual, this greatly facilitated the tying of the renal vessels, which was done with strong silk. The ligature was left long.

The kidney presented a number of cavities which were filled with thin purulent fluid, intermingled with thick flocculent coagulated material and peculiar round, semi-solid masses which impressed me as the organic skeleton of beginning stones which were not yet hardened by the deposit of salts. The pelvis of the kidney and the ureter were found to be filled with the same material. The latter was flushed out by irrigation as much as possible, yet a thin, soft rubber-bougie could not be pushed down into the bladder. Nor did I succeed in throwing warm boric water through the ureter by means of a hand syringe, although a good deal of pressure was used. After proper disinfection the cut in the muscles was closed by a number of cat-gut sutures, and the greatest part of the outer wound sewed up. A small drain was introduced through the abdominal fistula and the large irregular wound loosely packed with iodoform gauze. The patient stood the operation very nicely. Temperature and pulse remained normal. From the second day on she passed the normal amount of urine, which was as clear as before. The silk ligature which tied the pedicle was extracted four weeks after the operation. Recovery was progressing very favorably, the patient was already sitting up receiving company, etc., when on Sunday, April 26th, 38 days after the operation, and on the day menstruation was due, which however failed to set in, a short while after a normal micturition she felt a sudden dull pain in the "left" lumbar region, with an urgent desire to urinate. She tried to do so, but could not pass one drop. She waited a few minutes, and then tried again; not a drop. The doctor was sent for. He at once introduced a soft rubber-catheter. The bladder was empty. Hot drinks and digitalis were ordered. A restless night was passed, especially disturbed by the continuous lumbar pain. At an early visit on the next morning catheterization was again practiced. The bladder was still empty. Now the doctor conveyed the tidings to me. There was no doubt in my mind that the sudden absolute anuria was due to blocking of the ureter of the remaining kidney by some mechanical obstruction. I saw the patient at once. She was greatly depressed, as she was perfectly conscious, and being an intelligent person, understood what was at stake. We agreed to wait a short time, and in the meantime see whether we could with the help of very strong heart-stimulants, diuretic drugs, and the introduction of a large amount of fluid, increase the secretion of urine sufficiently to overcome the obstacle in the ureter. If we did not succeed nephrotomy would be necessary. To aid in the elimination of urea from the system cathartics were ordered. But as was feared would be the case, the anuria continued. Not one drop passed the blockade. Moreover, the lumbar pain increased, the pulse

became somewhat slower. Patient vomited once. On Wednesday, April 29th, at noon,  $2\frac{1}{2}$  days after the onset of the symptoms, I made the lumbar incision, with the patient in Lange's position.<sup>1</sup> As soon as the quadratus lumborum muscle had been divided a marked oedema of the subjacent tissues was noted. The perirenal adipose capsule was bluntly separated and the purplish red kidney appeared. It was not materially enlarged, but dense to the touch. A concretum could not be palpated nor did a needle plunged into the pelvis and the renal tissue at different points strike one. It was interesting however, to watch the many small fountains of arterial blood which were ejected out of every puncture-hole, synchronously with the pulse. I allowed these to spurt for a short while and thus reduce the immense arterial hyperæmia of the organ before I had them compressed. I now was obliged to add two short transverse incisions to the original longitudinal one, starting from both ends of the latter at a right-angle and penetrating the entire thickness of the erector trunci and sacro-lumbalis muscle (Bardenheuer's Thuerfluegelschnitt), in order to fully expose the upper portion of the ureter. Then the latter was longitudinally incised with a knife as low down as possible with the hope to be better enabled to extract a stone which might have become impacted in its course. As soon as the ureteral canal had been opened a mass of seropus, large shreds and coagulated pus and blood escaped. The same material absolutely corked the ureter for a distance of at least two inches. A thick probe pushed down with some force entered for perhaps one-half inch but then was stopped. It did not strike a stone. Evidently an abscess previously encapsulated in one of the pyramids had perforated into the pelvis of the kidney. A thin Nelaton-catheter was now introduced into the ureter downward alongside its wall, which was stretched with the help of two mouse-tooth forceps, and through it warm boric water forcibly injected by means of a hand syringe. Thus I succeeded, little by little, in washing out the debris backward towards the pelvis of the kidney. When the injected water returned clear the lower end of the catheter was cut off obliquely and pushed towards the bladder as far as possible and a number of syringes full of water flushed down into that viscus which had not been distended by a natural flow since three days. The patency of the ureter was thus re-established. That not the slightest obstacle was any more in the way of a normal kidney drainage was proved by a rubber-bougie which corresponded to the ureteral caliber and was passed down into the bladder in its entire length without any resistance. To guard as much

<sup>1</sup> ANNALS OF SURGERY, 1885. Vol. II., p. 286.

as possible against a return of this deadly occurrence, the wound in the ureter was still enlarged in an upward direction, thus dividing the pelvis of the kidney. The latter was found not to be materially enlarged but filled with the same material as the ureter had been. It was rapidly cleared by gentle irrigation. A curved steel-sound then introduced into the different calices failed to touch a stone. I was satisfied that the obstacle had been successfully removed. Now the wound was loosely filled with iodoform gauze, the rectangular skin muscle flap turned back and fastened to the opposite border by a few silk worm gut sutures which were again loosely tied. The incision in the pelvis of the kidney and the ureter had, of course, been left open.

The immediate as well as the remote result of this operation was gratifying in the extreme. The kidney at once resumed its work. At the evening of the operation dressing and bed covers were soaked with urine, on the second and third day somewhat less, as a great part of urine entered the bladder again and was voided per urethram. The gauze-tampon had no doubt become adherent to the wound of pelvis and ureter, and thus forced the urine to pass the natural passages. It was very tempting to leave the gauze in place for six or eight days, meanwhile allowing the wound in pelvis and ureter to heal by primary union. But after some deliberation it seemed better to me rather to adopt a slower but safer method. I extracted the gauze after three times twenty-four hours, to the great displeasure of the patient, as nearly the whole amount of urine at once made its way through the lumbar incision. Nevertheless the wound healed without any special reaction. A renal fistula established itself in the upper and lower right angle. These two fistulae were slowly drying up, towards the end of the fourth week after the operation, when the correctness of the after-treatment was clearly demonstrated.

One day before the next menstruation was due the urine, which had been clear and had for the most part passed the bladder, again suddenly made its exit through the lumbar opening in its entire quantity. Temperature rose to 101, pulse rate to 130. The catheter drew a few drops of heavily turbid water from the vesical cavity, but only once. Later on it was found empty. The former accident had recurred! A thin English catheter, bent according to the probable shape of the upper urinary passages, could be pushed in for several inches, and drew urine mixed with shreds. But at a certain distance it was stopped. Water injected through it returned murky. I deemed it to be the wisest to abstain from any further irrigation for the time being, as I could not see what I was doing and as the artificial safety-

valve guarded against a return of the anuria. I also thought it best to abstain, for that time at least, from trying to push a thin rubber bougie or catheter through the vesical mouth of and into the left ureter with the help of Boisseau du Rocher's cystoscope. I trusted in nature and time to dissolve the coagulated mass in the ureter and thus restore the former hopeful condition. But it took nature a good time to fulfill this hope. For eight weeks the kidney found its drain through the lumbar fistula. The patient was continuously wet and extremely annoyed and despondent, although large pads of moss nicely absorbed the fluid.

As the prognosis with reference to restoration of the normal flow of the urine was extremely uncertain, I designed a renal urinal, in the shape of a "bustle" as worn by the ladies a few years ago. A soft rubber-catheter, which drains the pelvis of the kidney and fits water-tight in the fistula, enters the bag at its upper end in such a way that it conveys the urine into it, but, by means of a valve prevents it from returning through its channel, if the patient should lean back in a chair for instance and thus compress the partially filled bag. A long tube with a stop-cock at its end is given off from the lower end of the bag and passing between the legs of the patient is fastened at some convenient spot in front. I have no doubt that this mechanism would have worked nicely. Happily we had no chance to use it, in this case at least, as in the seventh week, after the last clogging, a worm-like shred, 4 inches long, of a grayish-white color and the size of the ureter was expelled out of the latter's vesical opening and suddenly passed with a larger amount of urine, to the greatest delight of the patient. It took only a few days to dry out the upper fistula, but no persuasion from our side was needed to induce the patient to leave a drainage tube there in situ. It was no easy task to retain it in place. However it was forced to do so, and worn for nearly six months, although no urine ever passed it. The wound in the pelvis of the kidney had cicatrized, and the tube led down to it as a guide. Seven weeks ago, on December 12th, it slipped out by chance and could not be reintroduced on the following day.

To-day the wound is firmly closed and the patient in the best of health. She passes a normal amount of clear urine<sup>1</sup> and has no trouble whatever. Of course she is kept and keeps herself under close medical observation.

<sup>1</sup> I should mention that some turbidity of the urine was greatly improved during the latter part of last year by the administration of methyl-blue three times a day, 1½ gr. in capsule. Cfr. M. Einhorn, N. Y. Med. Record, 1891. Vol. 40, p. 643.

This case presents a number of interesting points:<sup>1</sup>

First, the strict indication for nephrotomy in a case of sudden anuria which occurs some time after nephrectomy and a period of uninterrupted recovery with the secretion of a satisfactory amount of urine. I should rather add the word "absolute" to sudden, as I have seen in my third case of nephrectomy that if the ureteral canal is not entirely blocked, the *vis medicatrix naturæ* can itself effect a cure. In that case cystoscopy, performed before nephrectomy, had demonstrated prolapse of the ureter on the other side and had therewith established the diagnosis of an irritative process in the remaining kidney, probably its pelvis.<sup>2</sup> On the thirty-ninth day after the operation, and after an equally long time of perfect comfort and undisturbed recovery, an abundant hæmaturia set in. But the blood and coagula, with a very scarce amount of urine, were voided per urethram; there was no "absolute" anuria. On the sixth day after the onset of this at times extremely critical trouble, the patient passed a stone, which at once put a pleasant conclusion to all further ailing. Only the very weak condition of the patient at that time prevented me from using the knife. Of course, I am now glad of this.

The answer *which operation* should be performed in such a case of sudden absolute anuria can only be the one—*Nephrotomy*. It will be best done in Lange's position, with an incision that permits free access to the pelvis and upper portion of the ureter for hands and eyes (lumbar longitudinal or angular incision or Bardenheuer's *Thuerfluegelschnitt*). Only if the obstruction would not be found at that portion of the urinary tract, certainly an exception, Bardenheuer's extra peritoneal exploratory incision or the incision of James Israel, of Berlin, proposed for a free access to the ureter in its entire length,<sup>3</sup> should be resorted to

<sup>1</sup> I want to emphasize at this spot that in my following remarks I exclude all reference to *tubercular disease* of the kidneys.

<sup>2</sup> Cfr. Author. The progress of cystoscopy in the last three years.—*N. Y. Med. Journal*. 1892. p. 173 and 174.

<sup>3</sup> *Ueber Nephrolithomie bei Anurie durch Nierensteineinklemmung; zugleich ein Beitrag zur Frage der reflektorischen Anurie.*—*Deutsche Med. Wochenschrift*. 1888. p. 7. This incision begins at the anterior border of the sacrolumbalis muscle and runs parallel to and about one inch apart from the twelfth rib to the latter's anterior end. From there it is carried obliquely downward near to the middle of Poupart's ligament, where it turns to the middle line and ends at the outer border of the rectus muscle. The incision also is extraperitoneal.



besides and the cause searched for alongside the lower portion of the ureter.<sup>1</sup> We undoubtedly have a right to go ahead in this way in view of the certain death of the patient if no relief is obtained.

A further interesting point is the coincidence of the repeated blockings of the ureter with the time of the menstruation. No better proof could be given of the great influence exercised by menstruation upon all the abdominal viscera, especially the kidneys, and above all upon the left kidney, owing, perhaps, besides the nervous connections, which are common to both, to its close vascular connection with the left ovary through the ovarian vein. It is well known that the left ovarian vein generally empties into the renal vein, whereas the right ovarian vein empties into the vena cava.<sup>2</sup>

There are a great many more interesting points in the history of this case which might be discussed here. But it would lead me too far in view of the limited time given me to-day.

<sup>1</sup> Cfr. A. T. Cabot. A successful case of uretero-lithotomy for an impacted calculus. *Boston Medical and Surgical Journal*, 1890, p. 247.

<sup>2</sup> The possible dependence of these renal accidents upon the peculiar anatomical relations of the left ovarian vein was suggested to me by Dr. Mary P. Jacobi. Cf. F. Hyeth. Text-book on Anatomy, Vienna, 1875, p. 949; Lusk's System of Midwifery, p. 25.) The greater frequency of hyperæmia of the left kidney has also been attributed to the fact that the left renal vein will at times pass behind the aorta. There evidently occurs an excessive hyperæmia in the remaining kidney also immediately after nephrectomy. Its presence is demonstrated by the sudden change in the transparency of the urine if that remaining kidney had already been slightly affected. I have seen that in two of my cases, and could not explain the phenomenon in a different way. Certainly it has been observed by many who have done several nephrectomies that in a number of cases immediately after the one unhealthy kidney has been removed the urine which descends from its, probably only slightly affected, fellow, and which had formerly been found comparatively *clear*—with the help of cystoscopy, or after nephrotomy on the other side had been done—suddenly becomes very turbid, and presents an unusually heavy deposit after short standing. As I have seen it can take weeks or months before this turbidity lessens or disappears. In the majority of cases it does so, however, but slowly and gradually.

Schede (*Meine Erfahrungen ueber Nieren extirpationen. Separat-abdruck aus der Festschrift zur Eröffnung des Krankenhauses*, Hamburg, 1889, p. 45, foot-note) also mentions this necessarily present, suddenly increased arterial pressure in the remaining kidney after nephrectomy on the opposite side. He is inclined to look at it as the probable cause of the acute epithelial necrosis ("Coagulations-Nekrose") in the tubuli contorti of I and II order of the kidney, which has been found in a few instances after nephrectomy on microscopical examination of the remaining kidney, and to which the immediate fatal result of the operation evidently was due.

I only should still like to state that as far as a careful perusal of the literature has shown me, this is the second case on record where nephrotomy successfully cured sudden absolute anuria occurring some time after previous nephrectomy on the other side, and the fourth where total suppression of urine setting in some time after an operation on one diseased and later useless kidney (nephrectomy or nephrotomy) and evidently due to an occlusion of the ureter of its fellow, has been overcome by attacking this remaining gland, which alone attended to the secretion of urine.

On January 3, 1882, B. Bardenheuer of Koeln, Germany,<sup>1</sup> had opened a pyonephrosis on the left side in an unmarried lady twenty-seven years of age by the lumbar incision. The abscess was soon closing up and patient doing well; only a very scarce amount of clear urine was voided through the wound. On February 8, the thirty-sixth day after the operation, a sudden chill with total suppression of urine set in. The catheter found in the bladder only some mucus and a small stone. Pain in the back and the right lumbar region running down towards the bladder; nausea. On the following day the high fever, pain and absolute anuria continued; patient had twice vomited some greenish mucus. February 9, operation: Lumbar incision on the right side with an additional transverse cut at its lower end which runs backward. The kidney was shelled out of its adipose capsule. When this had been anteriorily done the finger reached the pelvis of the kidney and the upper end of the ureter. A small stone could be felt in the latter, which by palpation suddenly slipped back into the pelvis of the kidney. At the same moment a stream of urine was expelled through the urethra. The communication between kidney and bladder had been re-established. Now the stone was pressed back with two fingers of the left hand into the ureter, the latter incised with a knife, and a smooth longitudinal concretment of the size of a bean extracted. Four more small stones were removed from the renal pelvis. The wound in the ureter was closed by three silk-sutures, and the large wound loosely packed with antiseptic gauze. Soon afterwards the urine made its way through the wound. On the fourth

<sup>1</sup>O. Thelen, Nephrolithotomie wegen Anurie. *Centralblatt für Chirurgie*, 1882, No. 12.

day after the operation chill and recurrent anuria. In narcosis the upper portion of the ureter is bluntly loosened for some distance, divided, and fastened in the lumbar wound. On March 12, the patient is without fever and slowly recovering.

In 1885, R. Clement Lucas, of London,<sup>1</sup> performed nephrolithotomy (following nephrectomy) for total suppression of urine on a female patient, thirty-six years of age. There was a strong family history of consumption. For seventeen years she had suffered from hæmaturia at intervals, and for nine or ten years this had been accompanied with pains on the right side of the abdomen; for seven years a tumor diagnosed as a floating kidney had been felt on this side. On July 14 nephrectomy was done for stone kidney on the right side. Uninterrupted recovery. On October 24, three and a half months after the operation, the patient was suddenly seized with most violent and agonizing pains in her back and left loin. The pain passed through the loin to the front of the abdomen and groin. She passed a little urine, but then all secretion stopped. Vomiting commenced soon, and was continued at intervals and whenever anything was taken. On the fifth day of anuria the patient became drowsy and weak, so that it was difficult to rouse her to obtain answers to questions. The pelvis of the left (remaining) kidney was opened and a conical stone extracted which had acted as a ball-valve to the top of the ureter. It was more than three-fourths of an inch in length and from three-eighths to five-eighths in diameter. Urine began to drop at once out of the wound as soon as the pelvis of the kidney was opened, but the pelvis was not found much dilated. For twelve days all urine was passed by the wound in the loin. Then one and a half ounce was passed with great pain from the bladder, and the quantity gradually increased. After the ninth day all the urine was voided by the natural passages. Ten weeks after the operation healing was complete. Five years later the patient was still living and enjoying the best of health.

In 1886 F. Lange, of New York City, reported a case of total suppression of urine in a man thirty years of age, which

<sup>1</sup> On a case of nephrolithotomy (following nephrectomy) for total suppression of urine lasting five days; complete recovery and good health five years after the operation.—*Proceedings of the Royal Med. and Chirg. Society, 1890.*

occurred eight weeks after nephrotomy on the left side had been performed for pyonephrosis and multiple stone, on October 2.<sup>1</sup> The first kidney, or, rather, the wall of the pyonephrotic sac, had to be left in place at that time. After a few weeks the discharge from the existing fistula was moderate, apparently very little admixture of urine. About November 25th patient commenced to complain of pain in the abdomen. Urine became scanty. Three days later only a few drops could be withdrawn from the bladder. Nothing had been passed within the last twenty-four hours. On the morning of the 29th abdomen tympanitic, very painful; principal pain, however, was located in the right side, while the first operation had been done on the left. Pulse weak; dyspnoea; beginning collapse. Not a drop of urine in the bladder. Occlusion of the right ureter was diagnosticated and nephrotomy at once done on this side. The fat from the posterior aspect of the kidney having been removed, an abscess was found in its substance and quite near the insertion of the pelvis. It was near perforation. Being opened, the finger passed without resistance into the pelvis. In withdrawing it a great quantity of bloody urine escaped. A long, slender, thin-bladed dressing forceps pushed into the first part of the ureter soon met with a resistance without having the touch of a stone. The obstruction was found to be a whitish-gray plug, about the size of the end phalanx of the small finger, somewhat flattened and conical, resistant but brittle and apparently consisting of an old fibrinous clot, into which watery substance and numerous gravel-like concretions were imbedded. It was washed out by means of a hand syringe. On the first day after the operation three quarts of a cloudy, slightly bloody urine had been discharged. Almost all the urine seemed to pass by the normal channel. The patient made an uninterrupted recovery. He is, as Dr. Lange kindly informed me, still living and able to work. He has a fistula in his left loin, which only discharges a few drops of pus, no urine, and probably leads down to remnants of stone. The fact that during the occlusion of the right ureter no urine was found in the bladder is conclusive proof that the left kidney had already at that time entirely lost its significance as a urine secreting organ.

<sup>1</sup> Two cases of renal surgery. *The Medical News*. 1886. p. 69.

Two questions are still strongly presenting themselves to the mind of the careful observer :

1. Is not the suppression of urine in a few of those happily rare cases where fatal, absolute anuria sets in and continues "immediately" after nephrectomy, also due to a similar mechanical cause, provided the cystoscope had previously demonstrated the existence of a working kidney on the side opposite to the seat of disease ?

It is well known that a number of deaths caused by acute uraemia after the removal of one kidney have been reported. If a thorough postmortem examination was not made or could not be obtained, they were mostly explained as due to a nervous reflex-anuria.<sup>1</sup>

2. If this sudden total suppression of urine sets in and continues "immediately" after the removal of one kidney in cases where,

- a. the retroperitoneal incision had been made,
- b. strong antiseptic solutions (sublimite and carbolic) were not used in the wound,
- c. shock and great loss of blood had not been present at the time of nor after the operation,
- d. the cystoscope had shown a well working kidney on the opposite side before the operation, and
- e. strong and continuous stimulation failed to work ;

And if then a deep and protracted chloroform-narcosis does not restore the renal function, thus making a nervous (reflex) origin of the anuria improbable :<sup>2</sup>

Is not nephrotomy on the remaining side then indicated ?

If nothing is done the patient will certainly die ; if an obstruction is found and removed, there is hope for recovery.

<sup>1</sup> That such a nervous reflex-anuria, dependent upon a mechanical irritation on the one side, really exists, is nicely demonstrated by the case of James Israel, *Deutsche Med. Wochenschrift*, 1., c. Man, 49 y., suffering for years from gout and right renal colic. November 15, 1886, left renal colic ; Nov. 16, total suppression of urine. Nov. 21, lumbar incision on the left side. Stone found in the pelvis of the kidney, entering and occluding the ureter ; extracted. A second stone is impacted in the ureter, 10 centim. lower down. It is pushed up into the renal pelvis with two fingers from outside of the ureteral canal, and then extracted through the same wound. Both kidneys at once resume their work, as could be proved by the different result of qualitative analysis of that urine which passed the bladder and that which was discharged through the wound.

<sup>2</sup> J. Israel, l. c., p. 6.

But suppose no mechanical obstacle were found in the pelvis of the kidney nor in the ureter!

Then an artificial direct depletion of the organ could perhaps still prove useful. It would reduce the hyperæmia, which followed in the remaining kidney upon the ligature of the renal blood vessels on the operated side.<sup>1</sup> (If the acute coagulation-necrosis of the epithelial cells in the tubuli contorti has taken place such a procedure will be useless. Still the puncture and direct depletion will not aggravate the trouble).

As far as I could ascertain, nephrotomy on the remaining side has never been performed yet in cases of this kind.

I then would not let a patient of this kind die without having tried with the knife to save his life. If there were the slightest hope that the patient could stand further operative interference I would cut down on the kidney and satisfy myself whether drainage from the kidney were free. And if everything there would be found in normal shape I would puncture the kidney in many different spots with a needle, allowing the small wounds to bleed freely. I would then only loosely pack the wound and take every care to avoid pressure from outside.

Reviewing this case,<sup>2</sup> the following conclusions may perhaps with propriety be drawn:

1. Before nephrectomy cystoscopy should, if possible, be performed to prove the presence of a working opposite kidney.

This will be generally unnecessary, if a renal fistula exists on the diseased side and the urine, voided per urethram, is clear and sufficient in quantity. But even in these cases cystoscopy will be a desirable procedure for making a more definite prognosis.

2. If the cystoscope had demonstrated the presence of a working opposite kidney, and if then absolute anuria suddenly

<sup>1</sup> Of course any increase in the renal arterial pressure will, under ordinary circumstances, increase the secretion of urine. But may not the sudden *excessive* hyperæmia enlarge the arterial capillaries in the glomeruli to such an extent as to compress the vas efferens, which begins in the centre of the glomerulus? The scarce amount of urine in the first one to two times, twenty-four hours after every nephrectomy, could be in part dependent upon this condition. The organism generally quickly regulates such circulatory disturbances. For different reasons it may now and then be unable to do so.

<sup>2</sup> And with reference to conclusions 3, 4 and 5 also reviewing my other five cases of nephrectomy.



sets in some time after nephrectomy and a period of uninterrupted recovery with the secretion of a satisfactory amount of urine, the cause must be a mechanical one. Nephrotomy on the remaining side is then indicated as the only means to save the patient's life.

3. Immediately after nephrectomy there is, in all probability, an acute hyperæmia of the opposite kidney. This hyperæmia also frequently occurs in the female sex, especially in the left kidney, at the time of the menstrual period, but probably to a much less extent.

4. Such hyperæmia may suddenly increase an incipient or hitherto entirely latent disease in this remaining kidney. It can even cause the perforation into the pelvis of the kidney of an abscess previously encapsulated in one of the pyramids.

5. Such an aggravation of disease in the remaining kidney may be repeated at a number of menstruations, but is, in the majority of cases, of a passing, not of a permanent character. After such attacks (cf 4) the remaining kidney often shows an improved condition.

## EDITORIAL ARTICLE.

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### PLICQUE ON HYSTERICAL COXALGIA.<sup>1</sup>

Muscular contractions form a most important symptom in joint-affections. Difficulty in diagnosis is therefore apt to occur when contractions take place without any joint-affection.

We meet these difficulties particularly in the knee-joint and the hip joint.

Brodie has first described this affection, simulating a joint-disease, under the name: hysterical coxalgia. He states, in regard to its frequency, that four-fifths of women in the upper classes, who are supposed to suffer from an arthritis, are simply suffering from hysteria. Paget states that one-fifth of all cases in the lower classes, who are supposed to suffer from a joint-affection, are in reality suffering from this disease. The disease is, therefore, quite frequent, and it is of importance to diagnose it correctly, as both the prognosis and the treatment are perfectly different from those of an arthritis.

1. A hysterical coxalgia occurs always very suddenly. The patient, frequently a young girl, complains of severe pains in the hip after a light injury or a fall, over-exertion or mental disturbance. She can either not walk at all or limps excessively. The extremity is soon found in an abnormal position, most frequently in adduction and rotation inwards, later followed particularly by flexion. The least pressure against the hips and the smallest motion occasion loud screams.

This condition may last for weeks, months, yes, years, without occurrence of local symptoms as infiltration, suppuration or atrophy. The general condition may continue good, although the patient keeps absolutely quiet. Although the disease may last very long, it may terminate in recovery. All symptoms may disappear without leaving a trace, just as suddenly as they occurred. As it is difficult to give a

<sup>1</sup>Gazette des hopit, 1891, No. 66.

correct description of hysteria the author pays particular attention to the symptoms.

The sudden and violent coxalgia is the most characteristic symptom, reaching its greatest intensity immediately, as it takes a very short time, a few days, before all the symptoms which we find in a tuberculous coxitis of months' duration, are present.

The existing causes are many and varied; mental impressions, bad luck, different affections of the nervous system and genital organs, slight traumata, over-exertion. Imitation is occasionally of some importance.

Paget states that in one case the brothers of the patient suffered from a progressed coxitis. The pain in hysterical coxalgia is quite characteristic.

It is almost always a sudden, violent, excessive pain, different from the deep-seated, yet bearable pain in tuberculous coxitis.

The greatest tenderness for pressure is frequently a little above lig. Fallopii. It is characteristic that the most superficial pressure, as a pinching of the skin, is able to provoke the most violent screams (Brodie's symptom).

Attempts of passive motions will produce as characteristic pains. A patient with hysterical coxalgia will complain of pain the moment we attempt the least motion, while in real arthritis such motions surely are impossible and while the pain first occurs, when motions are carried to excess.

Neither have patients with hysterical coxalgia painful muscular contractions during sleep, in the diseased extremity, as is found in coxitis. The abnormal positions of the limb may be similar to those of coxitis, yet vary somewhat. The contractions are sometimes excessive, so that the knee, for instance, is pressed against the abdomen. At other times the abnormal position varies from day to day. It is characteristic, too, that contractions rarely are limited to the hip; both the knee and ankle may show similar contractions. The whole contracted extremity may then appear perfectly rigid, almost as hard as wood.

The limp has no particular value as a diagnostic symptom, as the patients generally keep their beds and assume that it is impossible for

them to walk. If we succeed in making them attempt it we will discover the same exaggeration in their limping as in their other symptoms. The direct examination of the joint is usually very difficult on account of the patient's scream at every touch; the examination will only give negative results. There is neither infiltration nor increased local temperature nor swelling of the glands.

A slight infiltration of the skin is occasionally found in cases in which for some time local remedies, as fly blisters and tincture of iodine, have been used.

No matter how long the disease has lasted, we never find subluxation or crepitus in the joint or muscular atrophy.

The extremity may, perhaps, grow a little thinner on account of the long-continued immobilization, but real atrophy is not found. We may find other disturbances, such as anæsthesia, locally diminished temperature and cyanosis; but they are then not limited to the hip, but are found in the whole extremity.

The lack of the usual symptoms of coxitis forms the basis for the diagnosis of the hysterical coxalgia. Some deviations may be found. In very old and long-lasting cases trophic disturbances are occasionally seen; also atrophy, and even muscular contractions, fatty degeneration of the bones and changes in the articular surfaces of the joint-ends. Some of these cases may, perhaps, have been joint affections, as found in chronic myelitis. We have in narcosis a valuable means of making sure that no real joint affection is present.

The muscular contractions cease in the narcosis, and it is thus easy to show that all motions are perfectly free and that there is neither infiltration of the soft parts, nor crepitus, nor subluxation. Exceptionally only might we find this joint intact in a somewhat progressed tubercular coxitis.

Even under anæsthesia we will find, as a rule, some muscular contraction, particularly in forced abduction and some deep infiltration.

Paget and Charcot have mentioned two less obvious diagnostical signs.

The muscular contractions reoccur much quicker after the narcosis in real arthritis than in hysterical coxalgia.

The deep-seated pain produced by percussion of the trochanter major in real coxitis reoccurs as soon as the narcosis disappears, but is absent in hysterical coxalgia even when the cutaneous hyperæsthesia has returned.

The examination of the general condition of the patient is of great importance.

The patient has sometimes all the symptoms of neurasthenia, although we must not expect always to find convulsions, and hysteria, etc.

It is often impossible to find any signs of hysteria in the previous history on the present symptoms.

Paget has mentioned a number of points which may help to unveil a marked neurasthenia. Now we find them in the family history as hysteria, epilepsy, alcoholism and particularly mental disturbances; then in certain traits of character, as a too lively susceptibility to sentiments of joy or pain, then in a more or less abnormally developed intelligence.

Even their behavior may be of importance. Just as the hypochondriacs, they are taken up with their ailments, but, instead of the mental depression of the hypochondriacs, we find them rather satisfied and proud of being the object of general interest. At first they seem to stand their sufferings with real courage, but their energy disappears as soon as the question of standing the pain of an examination comes up.

This weakness for everything relating to their disease is contrary to the stoicism in patients with rheumatic and tuberculous affections.

It is also of importance to pay attention to other organic affections as metritis, obstipation, dyspepsia. Such a trouble may give indications for treatment. Hysterical coxalgia may last for years, and will then seriously affect the general health on account of the continuous confinement to bed. A weakness of the extremity, due to degenerations of muscles and bones, may then appear. Recovery occurs often very suddenly, even in cases which have lasted for a long time.

The contractions may disappear under the influence of some mental impression on account of a treatment which gains the confidence of the patient. Generally, it is true, the symptoms disappear only to be

followed by other hysterical symptoms. The recovery is not by any means permanent.

The hysterical coxalgia is par excellence a disease with intermissions, remissions and relapses. The slightest trauma is apt to produce relapse. It is, therefore, necessary with great care to protect the patients against contusions and falls for a time. Pengniesz thinks that continued increase of patella-reflex indicates that a relapse is probable.

2. The diagnosis of hysterical coxalgia offers difficulties in three directions :

*First.* It is necessary to exclude a possible arthritis of tuberculous, rheumatic or gonorrhœal origin. By a careful consideration of the above-mentioned symptoms we will be able to overcome this difficulty.

*Second.* The diagnosis becomes more difficult if a hysterical patient should get a real arthritis. This arthritis would present special traits, be a mixture of a real joint-affection with nervous contractions, which differ from those of pure hysteria, because they have a real cause, while they differ from the contractions of a common arthritis by their excess.

*Third.* It is necessary to be on guard for simulation, as in other hysterical affections, which may present great diagnostical difficulties.

A great many affections of the hip-joint and its surroundings may simulate hysterical coxalgia.

Rheumatic and gonorrhœal coxitis ought to be mentioned first on account of this very acute appearance.

The local temperature gives the best diagnostical point in regard to differential diagnosis. An acute arthritis, which appeared with such severe pains as a hysterical coxalgia, would surely show an increased local temperature. The hysterical coxalgia shows no such increase.

The presence of fever is an important diagnostical symptom. Hysterical patients may, to be sure, be able to produce slight chills and slight increase of temperature, but they are not permanent and quite insignificant, and, as a rule, there is no increase of temperature in hysterical coxalgia. As the disease protracts, or, when it excep-



tionally develops slowly, the differential diagnosis with a tuberculous coxitis may offer difficulties.

In cases of doubt we must examine under narcosis. Congenital dislocation of the hip has in reality no symptom in common with hysterical coxalgia, but the author maintains that an inflammation occasionally may occur in such a dislocated joint and that the usual symptoms of arthritis may be of such an acute and violent character that they may remind one of hysteria. An exact examination will quickly clear up the diagnosis.

The mixed forms, such as hysteria complicated with a real arthritis, present the most difficulties in regard to diagnosis.

The real arthritis may perhaps only be commencing and not so far present any local symptoms, but it may nevertheless, on account of the patient's mentally excited condition, produce muscular contractions and exclamations of pain. Theoretically these may only be considered symptoms of hysteria, but practically it is of the greatest importance not to once look that the patient's complaints have as a foundation an anatomical affection. It is easy to give a wrong prognosis or institute a treatment which may have serious results. Paget advises in such cases to avoid the name hysteria, rather using vague expressions till the diagnosis is sure.

The diagnosis ought to be still more reserved, if there is suspicion of simulation. Simulation plays an important role in coxalgia, as in other hysterical affections. In hysterical coxalgia, the result of some slight injury, and in which there may come up a question of responsibility and damages, the hysterical symptoms are rarely devoid of some calculation.

A simulation carried to excess may, on the other hand, point to hysteria. The contractions, at first voluntary, may then later become real.

Suspicion of simulation, therefore, may be justified, but it is difficult, on account of the mixture of real and imaginary symptoms in hysteria, to prove that we have a case of pure and simple simulation. Simulation on this point—except, perhaps, in legal complications—is, to be sure, rare, and we must remember that patients are much more apt to try to hide a coxalgia than to simulate one.

A moral treatment is of the greatest importance in the treatment of hysterical coxalgia. The prospect of recovery depends largely on the confidence the physician is able to inspire in the patient, and upon the surroundings.

A general rule for the moral treatment cannot be given; it acts in reality by indirect suggestion only. The author is more reserved in regard to treatment by direct suggestion, by which probably the local affection might be improved, but with the danger of making the nervous condition worse. Paget has at a time, when treatment by suggestion was unknown, spoken about the danger of exposing such nervous individuals to the influence of a too firm or brutal will. The results of such a treatment may be as serious as the disease itself.

The methods of local treatment have been numerous.

By degree electricity, magnetism, metallo-therapy, inunctions with belladonna ointment or subcutaneous injections of atropia, with massage, have been used.

Sometimes these remedies have given excellent results, sometimes they have completely failed. The different apparatus for immobilization are often not tolerated. It is necessary to apply them under narcosis and to take in the whole extremity, or contractions may occur in the knee or ankle. If applied they ought to be used for 18 days at least, and motions then commenced very gradually. Charcot thinks such apparatus do more harm than good.

If the diagnosis is sure, Brodie, and most others with him, recommends to avoid all immobilization and rest in bed, and to try to make the patient walk a little every day. If she refuses, electricity, massage and passive motions may be tried. If there is the slightest suspicion that a real arthritis is the cause of the complaint, complete rest becomes absolutely necessary. We possess in the permanent extension by weights a method of great benefit in both diseases, and it ought, therefore, to be our choice in hysterical coxalgia. It is most beneficial to commence with a smaller weight, and not increase beyond five or six pounds. The pain disappears first, the abnormal positions straighten out little by little, and the patient will gradually be able to sit up and walk around a little during the day; even then it is advisable to continue the extension during the night.

Surgical interference has usually been the result of a wrong diagnosis. Boeckel has in one case of a year's duration resected the joint ; he found pronounced atrophy of bone and cartilage, and the result was not very encouraging. A general tonic treatment with iron, quinine and good food is, of course, of great importance.

The author warns against the use of narcotics, even if the pains are said to be severe. The treatment of an organic trouble causing the disease has in many cases quickly cured the coxalgia.

H. MYNTER.

## INDEX OF SURGICAL PROGRESS.

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### GENERAL SURGERY.

#### I. Conditions Underlying the Infection of Wounds.

By WILLIAM H. WELCH, M.D., Baltimore. The number of different species of bacteria, particularly of bacilli, revealed by the systematic study of traumatic infections is much greater than was formerly supposed. The pyogenic staphylococci and streptococci, however, are by far the most common causes of suppurative affections of wounds.

A coccus, which may appropriately be called the staphylococcus epidermidis albus, is a nearly, if not quite, constant inhabitant of the epidermis, lying both superficially and also deeper than can be reached by present methods of disinfections of the skin. This coccus is found frequently in aseptic wounds. It may be the cause of disturbances, usually of a relatively slight degree, in the healing of the wound, especially when drainage tubes are inserted. It is the most common cause of stitch abscesses in wounds treated antiseptically or aseptically.

The bacillus coli communis is a frequent invader of various organs of the body in cases with ulcerative or other lesions of the intestinal mucous membrane. In such cases its presence is usually unattended by evidence of pathogenic action, but this bacillus may be associated with inflammatory affections of wounds, with peritonitis, and with abscesses.

There are many reasons for believing that the process of suppuration serves a useful purpose in combating bacteria and preventing their invasion of the circulating fluids and the tissues of the body.

The pyogenic bacteria set up suppuration by means of chemical substances produced by them and entering into their composition. The studies of chemotaxis have shed much light upon the mode of action of these substances.

The effects produced in the animal body by the pyogenic cocci are determined by many factors relating to the infectious agents and to the individual exposed to infection. There are differences in these effects depending upon the species of animal, upon the tissues and part of the body infected, upon the readiness of absorption from the infected part; upon the source, the number and the virulence of the organisms; upon the nature and amount of the toxic substances accompanying and produced by the bacteria, upon general predisposing conditions of the body, and upon local conditions in a wound such as the presence of foreign bodies, of pathological products, of dead spaces, of bruised, necrotic, and strangulated tissues.

Infectious agents, as they occur under natural conditions, may possess greater virulence than the same bacteria in artificial cultures, and this probably depends upon accompanying toxic substances.

Results of experiments on animals explain clinical experience concerning the aseptic healing of wounds by the so-called organization of a blood-clot.

The tissues of a wound should be handled so as to interfere as little as possible with their vital capacity to overcome bacteria.

Although the greatest danger of infection of a wound from without is by direct contact, nevertheless the possibility of infection from the air should not be disregarded.

Auto-infection may take place by the entrance into the circulation and tissues of pyogenic bacteria from the alimentary and the genital canals, but there is no evidence that this can occur when these tracts are in a healthy condition. Moreover, with the requisite lesions of these tracts other general and local conditions of the body are important, if not essential, factors in bringing about pyogenic or septic infection.

The presence in the circulating blood and tissues of certain chemical products of pyogenic and of putrefactive bacteria, as well as that of various other injurious substances, favors the growth in wounds of septic and pyogenic bacteria, both of those which may be carried to the part by the circulating fluids and those which may enter from outside of the body.

Whenever we have been able to demonstrate the presence in wounds in human beings of the *staphylococcus pyogenes aureus* or of the *streptococcus pyogenes* the wound either was suppurating or subsequently it suppurated.

Only in the minority of cases were the aseptic wounds which we examined free from bacteria. By far the most common organism in these wounds pursuing an aseptic course is the *staphylococcus epidermidis albus*, which without the presence of a "drainage-tube or other foreign body rarely causes suppuration in the wound.

The presence of microorganisms in layers of the epidermis deeper than can be reached by existing methods of cutaneous disinfection points to the skin, especially to that of the patient, as a source of infection to be carefully guarded against.

The substitution so far as possible of subcutaneous for cutaneous sutures lessens the chances of infection from this source, and particularly those of stitch abscesses.

Wherever applicable in surgical antisepsis, disinfection by heat should be preferred to that by chemical agents.

Previous experiments to determine the efficacy of disinfection of the skin by corrosive sublimate are vitiated to a considerable extent by the failure to precipitate the mercury with ammonium sulphide before testing by culture methods its germicidal power on the skin.

The mercury remains for days and weeks intimately incorporated with the epidermis.

Epidermal bacteria not killed by the sublimate may be brought into such relation with it that they will not grow in ordinary culture media until the mercury is precipitated by ammonium sulphide, and such bacteria may remain for days and weeks in the epidermis.

The results of Fürbringer's method of disinfection of the skin are found to be less favorable when they are tested after precipitation of the mercury with ammonium sulphide than without this precaution.

The best results in cutaneous disinfection we obtained by a method in which permanganate of potash followed by oxalic acid plays the principal disinfectant rôle,<sup>1</sup> as in the following method:

1. The nails are kept short and clean.



2. The hands are washed thoroughly for several minutes with soap and water, the water being as warm as can be comfortably borne, and being frequently changed. A brush, sterilized by steam, is used. The excess of soap is washed off with water.

3. The hands are immersed for one or two minutes in a warm saturated solution of permanganate of potash, and are rubbed over thoroughly with a sterilized swab.

4. They are then placed in a warm saturated solution of oxalic acid, where they remain until complete decolorization of the permanganate occurs.

5. They are then washed off with sterilized salt solution or water.

6. They are immersed for two minutes in sublimate solution, 1-500.

—*The American Journal of Medical Sciences*, Nov., 1891.

**II. On Bromide of Ethyl Narcosis.** By DR. ALEXANDER L. EBERMANN (St. Petersburg, Russia). At a recent meeting of the Pirogovian Chirurgical Society Dr. Ebermann made an interesting communication on the subject, based on 75 cases of his own. The series include 9 cases of opening abscesses, 1 tenotomy, 4 cauterization of hemorrhoids, 17 excision of tumors (10 benign, 7 malignant), 19 scraping out tubercular foci, ulcers, fistulas and rhinos-cleroma, 9 trepanations, 3 evulsion of in-growing toe-nails, 2 resection joints (of the elbow and knee), 1 reduction of inveterate luxation of the humerus, etc. The patients' ages varied from 8 to 70. Merck's preparation was invariably employed, the quantity of the drug administered oscillating in individual cases between 10 and 70 grammes. Esmarch's mask was always used, being, as a rule, kept at some distance from the patient's face; in some cases a piece of wax paper, with cotton wool, was placed into, and one-half of the quantity of the drug required poured over the wool. The duration of the narcosis varied from two to twenty minutes. Shortly after the commencement of inhalation the patient was asked: "Are you asleep (*Spitē*)?" and as soon as he or she answered, "I am (*Splue*)," the operation was proceeded with. In 65 out of 75 cases the operation was successfully completed under bromide of ethyl alone, but in the remaining 10 cases chloroform was

subsequently resorted to. Of the 10, in two it was intended to do so from outset ("to save time"), while in one the substitution became necessary in consequence of a complete failure of the bromide (the patient remaining awake in spite of his having inhaled as many as 60 grammes); in 3 the operations proved to require a much longer time than it had been expected, and in 4 the bromide was substituted by chloroform on account of its inducing a most violent excitement. On the whole, of accessory effects, a more or less intense excitation was observed in 8 patients; nausea and vomiting in 11, and dyspnoea in 1. In none of the 75 cases, however, any alarming symptoms ever occurred. The author's general conclusions were to the effect that 1, bromide of ethyl was a valuable anæsthetic agent both in minor and major operations, and 2, it presented certain advantages over chloroform, such as a rapid advent of analgesia, a literally quick course of narcosis, with a but short-lasting initial excitement, and a good consecutive subjective state of the patient. In the course of a discussion which has followed Dr. Ebermann's paper, Dr. Al. A. Troianoff has stated that, 1. according to his experience, the bromide is actually an invaluable anæsthetic, but suitable solely for minor operations, requiring not more than 10 minutes' time. 2. As regards major operations, the bromide is, out of any comparison, inferior to chloroform, since the latter is totally void of danger, while bromide, in corresponding large doses, can produce asphyxia." 3. In cases of reduction of luxations chloroform should also be preferred to the bromide, since the latter fails to induce a sufficient muscular relaxation. 4. The bromide is by no means free from disagreeable after-effects; on the contrary, the narcosis is frequently followed by nausea and headache. 5. In cases of minor operations it is sufficient to use from 10 to 15 grammes of the bromide, pouring the whole quantity over the mask. The narcosis ensuing in  $1\frac{1}{2}$  or two minutes and analgesia persisting for about 10 minutes, keeping up the narcosis by adding new portions of the drug, should be regarded as a dangerous practice. At all events, the maximum total dose which can be administered with safety does not surpass 30 or 40 grammes. Dr. Lev S. Ginsburg has said that: 1. Bromide of ethyl narcosis does not differ in any essential particular from a chloroform one, either of the agents producing anal-

gesia and muscular relaxation. 2. The bromide can be successfully employed in major operations, as well as in cases of reduction of luxation. 3. The best criterion in regard to the advent of complete analgesia is constituted by Frisquent. 4. As regards the influence on the vascular system, the bromide undoubtedly gives rise to a considerable fall of the arterial tension. Professor Eageny V. Pavloff has supported Drs. Ebermann's and Ginsburg's views, that the bromide is a safe agent and can be employed in cases of reduction of luxation and major operations. His experience has also showed that, after a bromide of ethyl narcosis the patient's general condition is much better than after a chloroform one. The speaker emphatically recommended a preliminary bromide of ethyl narcosis, followed by chloroform inhalations, which combination secures a substantial gain in time. [Some papers on bromide of ethyl may be also found in *Annals of Surgery*, 1890, March, pp. 219 and 220, and November, p. 551.]—*Vratch*, 1891, No. 41, p. 932.

VALERIUS IDELSON (Berne).

#### OPERATIVE SURGERY.

**I. On the Choice of Points for Amputation of the Lower Limbs from the Standpoint of Securing Stumps Most Favorable for the After Use of Artificial Limbs.** By MR. CHARLES TRUAX (Chicago). The conditions essential to a favorable stump for locomotion are a conical form without sharp corners or protuberances, with cicatrix underneath and preferably at the posterior margin, and length enough to obtain a good bearing in the stump socket. If these requirements are complied with, and the stump possesses the necessary firmness to bear the contact with the socket, the patient, if properly fitted, will be enabled to operate the artificial part of the member in such unison with the natural portion that detection of the former is almost if not quite impossible.

Where a stump is so formed as necessitates its bearing a portion of the weight of the patient at its end it is usually a source of annoyance, because it not only forms an inferior means of support, but is

constantly liable from the slightest causes to pain, irritation and ulceration.

In amputations of the femur the value of the stump to the patient increases with its length until a point is reached within three inches of the lower end of the bone. Here, at this point of three inches above the knee-joint, is the point of election, which should be adopted if circumstances are favorable.

In amputations of the tibia the value of the stump also increases with its length, and the same rule should be applied as in the case of the femur, excepting that the point of election should be the juncture of the lower and middle thirds. Here the amount of surface exposed to the lateral pressure of the socket is not of as much importance as in thigh stumps, because the weight of the body is principally carried by the condyles of the head of the tibia. These afford a firm, unyielding surface which, when once well fitted with a socket, will, if necessary, carry the whole weight of the patient. It is, however, preferable to secure the advantages of a natural, conical-shaped stump by amputating below the calf, and thus increasing the bearing surface, and removing a part of the pressure from the head of the bone. Further, the amount of leverage increases with the length of the stump, so that if the operation be performed at the point indicated, the patient will have better control over the artificial limb than if the operation be at a higher point.

This point of election not only gives to the patient every benefit offered by amputations at or near the ankle, but it enables the instrument maker to display his mechanical ability to the greatest possible advantage.

Following injuries involving the middle and upper thirds of the tibia, many works on surgery advocate the leaving of short tibial stumps, that the patient may be provided with what are known as knee-bearing legs, or those in which the weight is taken on the anterior aspect of the flexed limb. It seems almost unnecessary to present arguments to demonstrate that such limbs would be clumsy appliances at best, owing to the imperfect connection between the natural and artificial portions. Short tibial stumps usually contract to a greater or lesser extent, and for this reason should be avoided. I

would say that an amputation should not be performed within three inches of the joint. In cases where only from three to four inches of the tibia can be preserved, and there be no danger from inflammation in the joint, it would seem better, from my standpoint, to excise the remaining portion of the fibula. Its presence is of no benefit to the patient, while its removal facilitates the forming of a more conical stump, and insures a greater degree of firmness therein. Several cases have come to my knowledge, where the pressure of an artificial limb socket on the remaining fragment of fibula has proven a constant source of pain and discomfort, and one or two cases of ulceration I believe were due to this cause.

The fundamental principle that forms the basis for the new theory is the fact that the successful operation of a limb, whether natural or artificial, depends largely on the action of its joints. Therefore, unless the surgeon amputates at points that not only leave the natural joint intact, but provide below it sufficient leverage to swing the substituted portion, he will interpose obstacles in the way of the instrument maker that will prevent the construction of the best form of appliance.

To amputate through the knee or ankle-joint is to assume the position of the dog in the manger, for the remaining structures occupying the half of the joint are of no use to either the surgeon or patient, but take up room that should be used for joint mechanism. The natural half of a joint remaining after a knee or ankle disarticulation is of no more use to the patient than the odd half of a pair of shears, for only in a limited number of cases can much, if any, weight be borne by the ends of the bones.

It required only a brief experience in the construction of artificial limbs to satisfactorily demonstrate to my mind that patients in large numbers are being crippled annually by tarsal and tibio-tarsal amputations, but it was with considerable hesitancy, even after an extensive investigation, that I first dared to advise the entire abandonment of all operations of this class.

Patients who have suffered amputations of this class, after being provided with artificial substitutes, rarely walk as well (and to walk

at all requires the outlay of more labor) as where the amputation has been performed through the tibia.

Owing to the unsatisfactory service resulting from the use of artificial arms and hands, the surgeon is not warranted in adopting radical methods in treating injuries or disease in the upper extremities. On the contrary, he should exhaust the last resources of conservative surgery and save all of the parts possible.—*Journal American Medical Association, November 28, 1891.*

**II. Operation for Exposure of the Branches of the Third Division of the Trigeminal Nerve in the Zygomatic Fossa.** By V. HORSLEY, F.R.C.S. (London). The skin having been first shaved and washed with soap and water, is covered for twenty-four hours with a dressing of lint soaked in 1 in 30 carbolic solution. Just before the operation it is finally sponged with warm lotion, and the external auditory meatus, after being thoroughly cleaned out, is rendered more antiseptic by the insufflation of powdered boracic acid, or is packed with antiseptic wool or soft gauze. The patient is anesthetized, preferably with chloroform, so as to diminish facial congestion. An incision is then made, beginning above the upper border of the root of the zygoma and carried through the skin and superficial layer of fat only, straight down the front of the tragus and following the contour of the jaw behind the angle forward just below the lower border of the body as far as the facial artery. The triangular flap just marked out is then raised, the knife cutting the layer of fat and superficial fascia which lies immediately over the deep masseteric fascia. In this latter ramify the branches of the facial nerve. The flap is to be drawn forwards and upwards with suitable traction until the anterior border of the masseter is reached, and the edge of the parotid and the lower border of Stenson's duct are clearly defined. The degree to which the parotid gland covers the masseter muscle varies, of course, in different individuals, but this is of no consequence. What does matter is that sometimes collecting tubules of the lower lobules run up toward Stenson's duct just within the anterior border of the gland, covered only by a thin layer of the parotid fascia. Unless care be taken in defining the edge of the parotid or the fascia



left uninjured in the next step of the operation, one or other of those tubules may be divided or torn, and subsequent annoyance may be caused for some days by a flow of saliva through the track of the drainage tube.

The next step is to divide the fascia, muscle, etc., between Stenson's duct and the highest branch of the fascial nerve. The nerve branch and duct being obvious, the masseteric fascia is split horizontally between them over the whole breadth of the muscle. In doing this the branches of the transverse facial artery will probably be wounded; if they are tied at once they will give no further trouble. the fascia is then seized with dissecting forceps, and undermined all round with the back of a knife or some blunt instrument. It has been recognized for some time that if a nerve in its continuity be pulled by a small blunt hook, the point of traction being so narrow many nerve fibres may be seriously damaged, giving rise to subsequent paralysis. It seemed to me that this could be avoided by employing retractors which should have a convex outline towards the structures they were separating, so that the nerve they are drawing aside should slip round them as on a pulley. The concave side being nickelized acts as a reflector, carrying the light to the bottom of the wound. With such retractors, and with the aid of a blunt instrument, the hole in the masseteric fascia can be steadily widened until it is about three centimetres in diameter. The parotid gland should now be retracted towards the ear, so that the finger can freely detect the posterior border of the jaw. The masseter muscle is then to be divided, preferably with scissors, on the jaw for the posterior two-thirds of its extent. The rapid oozing from the branches of the masseteric artery can be stopped at once by the application of a small sponge with some very hot lotion, though the arrest of the bleeding is specially provided for by the pressure of the retractors. The periosteum of the jaw is then peeled off, together with the superjacent muscle, until the finger and the electric light (which is absolutely essential for the success of the operation and should be worn on the forehead) have made perfectly evident the sigmoid notch, the posterior border of the coronoid process and the neck of the jaw.

The small wound in the muscle should then be plugged with a piece of hot dry sponge for a moment while preparations are made for dividing the bone. Now, this division consists practically in extending the sigmoid notch down as low as the upper orifice of the dental foramen. The dental foramen is situated about opposite to the point where the masseteric ridge—which is really, of course, a continuation of the outer border of the neck of the jaw—reaches the middle of the vertical ramus. Although arbitrary measurements are dangerously untrustworthy, it may, perhaps, be better to mention that this point in the adult is usually from 12 to 15 millimetres (measured in the line of the ramus) from the bottom of the sigmoid notch. To prevent possible fracture of the jaw and to aid subsequent division of the same with bone forceps, I think it best to cut out the U-shape required by first marking with the drill the presumptive position of the dental foramen, then carrying up on each side at the proper distance a row of holes, made with a drill, completely but only just penetrating the bone. These holes are best drilled with the central pin of Farabœuf's trephine, and then a small centimetre disc of the jaw should be taken out opposite the foramen. If this be done just at the opening of the foramen the periosteum on the inner side of the jaw appears, and on its division the inferior dental artery comes into view, while lying behind and posterior to it is the inferior dental nerve. If the nerve is not seen at once it is probably just under the posterior border of the trephine opening, and gentle search with the seeker will reveal it. A reliable silk ligature may with advantage be looped around it at this stage. The rest of the bone marked out by the drill holes should next be removed *lege artis*.

The internal maxillary artery giving off the interior dental branch is now seen, and if it is large and the walls degenerated so that it will not stand much traction it had better be divided between two fine ligatures, and the ends pushed out of the way. A quantity of loose yellow fat is now seen filling the bottom of the wound, and if it interferes with the next step some large lobules of it may be quickly extracted with the dissecting forceps. The inferior dental nerve, secured by the ligature previously passed around it, should now be divided at its lowest part and raised, while the fat, etc., is pushed away

from around it with a conveniently stiff and narrow retractor. In doing this it is traced upwards to the point where it is coming from beneath the external pterygoid muscle. This latter is also to be levered upwards with the retractors, and by this means the nerve can be followed out to within about a centimetre of the foramen ovale. It should then be cut as high as possible and the piece removed. During these manipulations the lingual nerve may have appeared in sight, but as a matter of fact it lies half an inch deeper than the inferior dental, in the line vertical to the ramus, at a point just above the dental foramen, consequently search must be made for fully this depth if it should not have been found before. A large length of it is then removed in the same way as from the inferior dental. A small drainage tube and an absorbent dressing complete the operation.—*British Medical Journal*, Dec. 5, 1891.

**III. Operation for Removal of the Gasserian Ganglion and the Division of the Fifth Nerve behind the Latter.** By VICTOR HORSLEY, F. R. C. S., London. In considering the possibility of relieving cases of inveterate neuralgia where recurrence of the pain had taken place, I thought one might be able to remove the Gasserian ganglion or divide the fifth nerve behind it, and I made, some years ago, dissections to see how far the Gasserian ganglion could be separated from the cavernous sinus. On first exposing the ganglion from the pterygoid fossa and opening the middle fossa of the skull, freely following up the inferior division of the fifth nerve, I found that one could raise the inferior division and so the lower half of the ganglion from its bed in the dura mater without damage to the carotid artery in the canal or to the cavernous sinus, but that when one attempted to strip up the upper half of the ganglion from the cavernous sinus it invariably tore the wall of that cavity. For this reason I believe that the operation of complete removal of the Gasserian ganglion is not possible, but that in the operation which Mr. Rose has subsequently described only a portion of it can be taken away.

Finding this to be the case, I then considered the possibility of dividing the fifth nerve behind the ganglion. It is well known that the fifth nerve enters the dura mater just beneath the edge of the

tentorium, and that it runs afterwards in a small but roomy canal in the dura mater, joining the Gasserian ganglion, which lies in a similar cleft on the upper surface of the petrous bone and on the roof of the carotid canal. Some experiments on the monkey to expose the crura had shown me that it was possible to expose the temporo-sphenoidal lobe, and then, by raising the brain carefully with a broad retractor, to lay bare the floor of the middle fossa of the skull. On trying this on the dead body I found that it was perfectly possible in man also, the only trouble being the small veins which come from the temporo-sphenoidal lobe, and which enter the petrosal sinuses. If these be ruptured the hemorrhage is very free, and although not dangerous to life, nevertheless very effectually hinders the performance of the operation.

This exposure of the temporo-sphenoidal lobe in man I have carried out by making a large temporal flap, starting from the anterior extremity of the zygomatic process, and running upwards to the temporal ridge, following that line and descending along it to the asterion. The temporal muscle, after being separated from the bone, is then best removed, so far as its posterior half is concerned, and then the whole of the squamous portion of the temporal taken away by means of a trephined hole and suitable bone forceps. Anteriorly the middle meningeal artery may be dealt with where exposed, being simply ligatured in the dura mater. The dura mater is then to be opened along the full length of the area of bone removed, and the temporo-sphenoidal lobe thus laid bare. A broad copper retractor, with smooth and everted edges, is then gently slipped underneath the lobe and slowly but steadily raised. The lobe is partly moulded, partly lifted upwards, and the floor of the skull is then easily seen and illuminated with the electric light. The guide to the fifth nerve now is the upper border of the petrous bone. The lobe being raised a little more, the edge of the tentorium will be defined and the point at which the fifth nerve passes beneath it could, in the first case I operated upon, be seen. The position of the canal in which the nerve is lying just above the ganglion must then be estimated, and a small puncturing incision made into it. As it is about a quarter of an inch in diameter, it can be recognized as soon as the puncturing instrument passes into it, and the dura forming

its roof should then be further slit open. The nerve in this way is exposed, and is found to be freely lying in the little passage.

The first case on which I operated in this manner was a patient in whom I had previously removed a portion of the inferior dental and of the infraorbital. The recurrence of pain, for which she then desired further operative relief, began in the auriculo-temporal nerve, the only branch remaining of the inferior division which had not been cut. As the pain, however, also ultimately invaded apparently the stump of the middle division, I thought it best to attempt the operation of dividing the nerve behind the ganglion. The patient had not eaten any solid food for several months, and was not in a good condition to undergo the operation. However, as her state was a very desperate one, I agreed to perform the operation, warning the friends that there might be fatal collapse even on the table. As a matter of fact, the operation presented no special difficulty beyond that of being very tedious. I resected the zygoma in order to have more room, but I feel sure now that that was a useless complication—that it was quite possible to have reached the nerve without it, and I regret having done it, because I think it of course aided in producing the shock which caused a fatal termination to the case. On opening the dura mater the brain bulged moderately into the opening, but as soon as the effect of the shock began to show itself it of course sank. On exposing the nerve in the canal behind the ganglion I passed a small blunt hook around it, and it then occurred to me that the small branch of the basilar artery which accompanies the nerve might give some trouble. I therefore thought one might safely attempt avulsion of the nerve from its attachment to the pons, and on gently drawing on it with a hook this was easily accomplished and without even any noteworthy oozing. The wound was closed in the usual way. Unfortunately the patient never rallied from the operation, and died seven hours afterwards, obviously from shock.—*Brit. Med. Journal*, Dec. 12. 1891.

## HEAD AND NECK.

**I. Tumors of the Jaws Due to Abnormal Development of Teeth.** By DR. HILDEBRAND, of Göttingen.—These are of great variety, and the case cited by the author seems unique in that all three maxillary bones were affected, and to a marked degree.

His patient was a boy of 9 years, who was said to have first presented a swelling of the face one year previously. This was at that time confined to the left side, and six months previously was incised by a local physician, who evacuated a little blood and pus. When seen the upper jaw on each side presented a hard swelling, especially noticeable over the left maxilla. The mouth was exceptionally wide, and on opening it the alveolar processes were seen to be irregularly nodular and thickened. Most of the first teeth had been lost. The right canine was directed nearly forward, back of it one rudimentary molar was seen. On the left side two rudimentary molars were found, together with two similar teeth projecting from the hard palate near the alveolar border. The teeth of the lower jaw were irregular and imperfect. A fistula at the site of the earlier incision was opened, and an opening cut in the anterior wall of the left upper jaw. The entire antrum of Highmore seemed filled with a mass of milk teeth and second teeth, partly free, partly forced in conglomerate masses, and irregularly directed in between these were soft, grayish granulations, cheesy in appearance and fætid in odor.

The antrum was cleaned of its contents. On the opposite side an opening was chiseled in the alveolar process and the right antrum, also filled with conglomerate masses of teeth evacuated, partly at this sitting, partly at a subsequent operation. Both cavities drained.

Some months later the child was again seen. The upper jaws had diminished somewhat in size; there was a persistent fistula at the left cheek.

The lower jaw, in the interval since the first operation had increased noticeably. It was largely distended, especially on the right side, and it was thought that a sharp and nodular prominence could be felt in its thin walls. Incision along its lower border on each side, the body opened and a large space found filled with teeth



and rudiments of teeth similar to those in the superior maxillar already described. Both sides evacuated, leaving cavities the size of hen's eggs, the right being somewhat larger than the left. Drainage, healing.—*Deutsch Zeitsch für Chirg*, Bd. 32, Heft 3 and 4.

**II. Violent Hemorrhages After Tracheotomy.** By DR. ADOLF MAAS (Berlin).—Despite the vast amount of what has been written on the subject of tracheotomy and the condition demanding it, but scanty reference has been made to the severe hemorrhages which at times follow opening of the air passages, or to the source of the bleeding in such accidents. He presents an extensive analysis of 17 cases which are carefully investigated. He differentiates in these cases two chief sources of the bleeding, viz.: That from large vessels about the arch of the aorta and pulmonary hemorrhages. The first may be divided as follows:

(a) Erosion of vessels (left innominate vein) through progressive diphtheritic process; (b) pressure of the lower end of the canula on vessels previously softened by diphtheritic conditions (*arteria innominata*), and (c) alteration in the vessel walls, probably due to a change of the coats into granulation tissue as seen in a granulating wound (innominate and right carotid arteries).

The cases of pulmonary hemorrhage (11 in all, 7 of which were fatal) showed in some cases broncho pneumonia, while in others no pathological change was discovered.—*Deutch Zeitsch für Chirg.*, Bd. 31, Heft 3 and 4.

CHARLES A. POWERS, New York.

## CHEST AND ABDOMEN.

**I. Bronchotomy through the Chest Walls for Foreign bodies impacted in the Bronchus.** By DE FOREST WILLARD, M.D., (Philadelphia).—The author reports the result of a number of experiments upon dogs in which an opening was made in the chest wall, one or more ribs excised and the bronchus thus reached either anteriorly or posteriorly. The operations were all fatal, and his conclusions were as follows:

1. The bronchus as in dogs can be reached either anteriorly or posteriorly through the chest walls, but the anatomical position is in such close proximity to large and important structures that safe incision is a matter of extreme difficulty and danger.

2. Bronchotomy through the walls of the thorax is an operation attended with great shock from collapse of the lungs, and until technique is further advanced is liable to result in immediate death.

3. Collapse of the lung is more serious in a healthy organ than in one previously crippled by disease.

4. The serious inherent difficulties are shock, suffocation from lung collapse, enormous risks of hemorrhage from pulmonary vessels, injury of or interference with the pneumogastric, great and fatal delays owing to the exaggerated movement of the root of the lung, caused by the extensive dyspnoea.

5. Closure of the bronchial slit is slow and dangerous. To leave it open causes increasing pneumothorax by its valve action, and also permits the entrance of septic air into the pleural cavity.

6. Although a foreign body can be reached by this route, yet removal is hazardous. To secure a subsequent complete cure seems in the present state of knowledge very problematical.

7. When the presence of a foreign body in the bronchus is definitely determined, and primary voluntary expulsion has not been accomplished, there is great danger in permitting it to remain, even though it may but partially obstruct the tube. The risks of immediate and of subsequent inflammation are serious.

8. Low tracheotomy is then advisable in nearly every case when the presence of a foreign body is certain; it adds but little to the risks and affords easier escape for the object even when extraction is not feasible.

9. Subsequent dangers arise from severe and prolonged instrumentation, not from tracheotomy.

10. Voluntary expulsion is more probable after than before tracheotomy.

11. Tracheotomy is permissible even after an object has been long in position, unless serious lung changes have resulted.

12. The question of tracheotomy will depend largely upon the form, size and character of the foreign body.

13. The term bronchotomy should be limited to an opening of the bronchus and should not be employed to designate higher operations.

14. The risks from thoracotomy and bronchotomy following unsuccessful tracheotomy are much greater than the dangers incurred by permitting the foreign body to remain.—*Author's Abstract.*

**II. Retention Cyst of the Breast.** By Dr. FRITZ CATEN (of Griefswald).—A baby of eight months presented a movable, subcutaneous cystic tumor at the middle line of the sternum. It was the size of a walnut. The mother noticed a lump the size of a pea when the child was 14 days old, this having steadily enlarged. Aspiration withdrew a clear watery fluid which showed, microscopically, only scattered epithelial cells—chemically, only sodium chloride.

The tumor was easily shelled out. The inner surface of the cyst was granular, with atheromatous-like material. Its wall was of connective tissue, without papillæ, but presenting glands with long tubes of exit perfectly corresponding with ordinary sweat glands. The cyst is, therefore, to be regarded as a sweat gland retention cyst, and is of interest because of its exceptional seat.—*Deutsch Zeitsch. für Chirurg. Bd. 31, Heft. 3 and 4.*

CHARLES A. POWERS (New York).

**III. Malignant Disease of the Navel.** By R. T. MORRIS, M. D. (New York).—The author reports four cases which show that when malignant disease occurs in other parts of the body it may appear as a secondary complication at the navel, and the character of the disease at the navel appears to have been the same as that of the malignant disease of other structures in the four cases reported—namely, sarcoma in one case and carcinoma in three cases.

In none of these cases, so far as the author is aware, was there any means for secondary infection except by way of the blood current, for the navels were not in contact with other diseased structures.

In two of the cases omphalo-mesenteric remains were found in the diseased navels, and it is possible that the other two navels which were not examined contained such remains also. The facts as stated

show that in two cases at least the secondary malignant disease occurred at a point particularly rich in embryonic cells, and Cohnheim's theory relative to the development of tumors from latent embryonic cells as a result of irritation is forcibly brought to mind. The causative elements of sarcomatous and of carcinomatous disease apparently found their way through the blood current to the navel in four patients, and the navels of these patients became infected with disease similar in character to that of distant structure in the respective patients.—*Author's Abstract.*

**IV. Femoral and Ventral Hernia in Woman.** By Dr. H. O. MARCY (Boston). The author advocates the dissection of the sac to its very base, which is sutured across and removed. The internal ring is carefully closed by a line of deep, double, continuous tendon sutures. The canal is narrowed and closed in a similar manner, and the wound is sealed with iodoform collodion without drainage. The operation is conducted with the strictest antiseptic care, and since Dr. Marcy was the first to use and publish the advantages to be derived from buried animal sutures, and systematically to extend their applicability in the general field of surgery, we quote his emphatic directions: "There is but one rule, and it cannot be too rigidly enforced—the *aseptic* suture must be *aseptically* applied in *aseptic* structures, and the wound must be maintained *aseptic*. The failure of either of the above-mentioned factors not alone endangers the results, but may be followed by the most serious consequences. Modern surgery demands of the operator every safeguard to ensure an aseptic wound, but he who uses buried animal sutures must take, if possible, even greater precautions, since infection carried into a wound thus firmly closed is for obvious reasons attended with much greater danger than in a wound united by interrupted sutures which, at the end of a few days, are to be removed, and when drainage is relied upon to permit the escape of infective or foreign material. It is in part on account of defective technique, the use of drainage and the too-often septic wound that failure to effect a cure after hernial operations so generally occurs."

The author began to use the buried animal suture in operating for the cure of hernia in 1871, and since that time has for the most part

used it in the closure of all operative wounds, and in all his operations for the cure of femoral hernia, where the integrity of the intestine has not been involved he has never observed any subsequent symptoms indicating danger, and so far as he has been able to learn there has not been a single recurrence. There is little pain, and even oedema of the tissues does not ensue. After a few days in bed the patient is allowed to sit up. In some instances he has permitted the use of the chair the second day without any apparent harm. He never advises the subsequent wearing of a truss." \* \* \* "If it can be demonstrated that femoral hernia is curable, then the advisability of the operation should be taken into consideration, and if it can be proved that the cure remains permanent it adds much to the argument in favor of operative measures, but where it is demonstrated that, under proper precautions, based upon an accurate anatomical knowledge of the structures involved, the operation is not severe, does not cause long detention from active duties, does away with the punishment inflicted by the life-long wearing of a truss, and is almost without danger, there remains no reason why all the sufferers from femoral hernia should not profit by surgical measures, and demand to be restored to the ranks of active service." Dr. Marcy makes an equally strong plea in behalf of surgical interference for the cure of sufferers from umbilical and ventral hernia. In umbilical hernia he dissects the peritoneal sac quite within the margin of the ring, sutures it across at its base and resects it. The subsequent steps of the operation are conducted under irrigation. There are conditions when it is wise to resect the ring and close as in an ordinary laparotomy, but the method which Dr. Marcy more generally recommends is one quite peculiar to himself. The structures composing the ring are divided laterally upon the plane of the abdominal wall about one-half of an inch in all directions. This admits the coaptation of the sundered parts, and by lines of strong continuous tendon sutures the separated edges are coapted in a way greatly to broaden the united parts. This widens the line of union to an inch or more instead of bringing together the narrow edges of the tendinous ring, and beside affording this great depth to the united parts, it brings together refreshed surfaces in a high state of vitalization, likely to be followed by firm

union. It also admits the joining of the tissues in three distinct layers of strong sutures. As in the other forms of hernia, the skin itself is closed by a line of running or lacing sutures taken from side to side through the deeper portions of the skin only, which admits of its coaptation by sutures entirely hidden from view. Such a wound requires no drainage, and it is permanently sealed with collodion.—*Proceed. Amer. Assoc. Obstet. and Gynecol.*, 1891.

## AUTHOR'S ABSTRACT.

**V. Cholecystotomy** (Czerny's Operation). By DR. WINKELMANN (of Strassburg). After a short review of the various plans proposed for the management of the gall bladder in and after its opening he gives adherence to the ideal operation as set forth by the Heidelberg surgeon, and cites the following illustrative case: A woman of 38 years was admitted to the surgical ward with a tumor the size of a fist, corresponding in all particulars with a distended gall bladder. It was above the navel, a little to the right of the median line—median sections form a point—a finger's breadth below xiphoid process to over three fingers breadth below the umbilicus. From the largely distended gall bladder 300 ccm. of light fluid were withdrawn. A hard mass the size of a finger's joint was felt in the proximal part of the cystic duct. This was with difficulty pushed into the gall bladder, when the viscus was incised, the stone withdrawn, and the bladder wound immediately sutured with silk. The abdominal peritoneum was sewn above and below with silk, and in the small interspace the gall bladder so fastened that the cut in its wall fell to lie immediately below the abdominal gap. Complete closure of the abdominal wound except over a very small area at the site of the sutured viscus. Here an iodoform wick was inserted. Freedom from any peritoneal complication, prompt recovery.—*Deutsch Zeitsch. für Chirurgie, Bd. 31, Heft. 3 and 4.*

CHARLES A. POWERS (New York).



**VI. Echinococcus of the Liver Operated on by Costotomy.** By DR. A. BRUNNICHE (Copenhagen). October 17, 1886, Th. B., a young Icelandic woman, æt. 20, entered the hospital with symptoms which apparently indicated a right-sided tuberculous pleuritis, namely, infiltration of the right apex, change in the voice, sweat, failure of the general nutrition and disturbances of digestion. Examination of the sputa was not then well in vogue in that hospital. As the patient began to have rigors and grow worse, a trial puncture was made without result. In December a greater prominence of the right hypochondrium and epigastrium was noticed, while the anterior border of the liver was felt three inches above the umbilicus. Friction sounds were audible on the right side in the fossa infraspinata. December 13 a second trial puncture was made in the ninth right intercostal space and a small quantity of purulent fluid drawn off; this was examined under the microscope, but revealed nothing definite. As the diagnosis of empyæma was thought certain, cystotomy was performed December 15, and a six centimetre piece removed from the tenth rib in the posterior axillary line. About 1,100 grams of fœtid pus were removed which contained large yellowish and gelatinous masses as well as the remainder of a number of torn membranes which presented a distinct stratification and were studded with prominences of the size of a pea. No hooks could be found. The cavity could be felt below as a funnel-shaped hole piercing the smooth surface of the diaphragm. The patient bore the operation well. The purulent discharge diminished, but the wound could not be closed on account of the discharge of bile. The prominence of the right side decreased; several calcareous masses were removed. The patient's appetite and general condition improved, although she constantly lost quite a quantity of bile. The cavity decreased in size, the fistula contracted, the drainage-tube was removed; the patient increased in weight and had naturally colored stools. The fistula finally closed entirely, and the patient was discharged as cured February 23, 1887. The writer cites two similar cases. Firstly, that of Krause (*Sammlung Klinischer Vorträge*, v. R. v. Volkmann, No. 325, 1888), where

a young man, æt. 27, presented an echinococcus cyst situated upon the upper convex surface of the liver necessitating, on account of the upward pushing of the diaphragm, the performance of costotomy and the opening of the cyst through the diaphragm. A drainage tube was inserted and the wound preserved free from irritation or infection, although a large amount of purulent fluid was discharged. Secondly, that of James Israel (*Verhandl. d. d. Gesellschaft f. Chirurgie*, viii, 1879, 1, p. 17), which was treated after Volkmann's method, costotomy, and as it could not be determined whether the diaphragm was adherent to the tumor the wound was tamponed with carbolized gauze for seven days, and finally an incision was made into the cyst through the diaphragm.—*Hospitals-Tidende*, No. 30, 1890.

F. H. PRITCHARD (Boston).

#### GENITO-URINARY ORGANS.

**I. Intra-peritoneal Rupture of the Bladder.** By Prof. P. EDWARD ROSE (of Berlin.)—The author is so fortunate as to add to the few cases in which success has followed abdominal section in intra-peritoneal rupture of the urinary bladder. This case is the first in which the open treatment of both vesical and abdominal wounds has been successful.

The patient was a boy of seven years, who was said to have been run over by horses and heavy wagon. Shortly after the accident he complained of severe pain in the abdomen, and was able to urinate only by drops, the water being bloody. In a few hours nausea and vomiting set in, this continuing and being accompanied by unyielding constipation. Two days after the accident he was admitted to the hospital. Temperature sub-normal; pulse 130; mind not wholly clear. Abdomen uniformly distended and sensitive. Dullness in the right lumbar region, these parts being deeply colored by extravasated blood, a small cedematous area just above the pubes. Reden's peritoneal catheter withdrew about 4 oz. of bloody urine. Abdominal section from umbilicus to pubes. On opening the peritoneum about a pint of bloody fluid welled out of the abdomen. The bladder was closely contracted and presented a rent  $\frac{3}{4}$

in. wide at its anterior and upper surface. This rent was not sutured. The space about it was thoroughly washed, a large drain placed in the abdomen on either side, packed about with iodoform gauze. A catheter was introduced into the bladder and left in place.

The urine was passed for the first time by the natural way on the 13th day. The space above and about the bladder gradually filled and contracted, and on the 56th day the abdominal wound was closed. Some weeks later calculi formed in bladder and were successfully removed.—*Deutsch Zeitschr. für Chirurgie*, Bd. 31, Heft 3 and 4.

**II. A Contribution to the Subject of Fatty Tumors in the Scrotum.** By Dr. CARL KOCH (of Nürnberg).—A man of 49 years sought treatment on account of a large scrotal tumor. He had never been ruptured and had never noticed a local swelling until two years previously, at which time there seemed to be two small, separate nodules on the cord above the right testis. These increased in size and became a single mass. One year after discovery the tumor was rather larger than a fist, and when seen by K. was an enormous mass, which reached to the knee. It seemed of a soft, elastic consistency, harder in some places than in others. At the site of the external ring it seemed to send a process into the inguinal canal. The skin over it was thinned and distended, but otherwise normal, and was movable. The testis, of normal size, was fixed at the under part of the tumor. The penis was concealed beneath the skin. After division of the cord at the external ring the contents of the right half of the scrotum were removed. The tumor weighed 10 pounds. It was made up of fat lobules, bound with a dense fibrous tissue, and seemed to take its origin from the cord. Prompt recovery.—*Deutsch Zeitschr für Chirurgie*, Bd. 32, Heft 3 and 4.

CHARLES A. POWERS (New York).

**III. On External Urethrotomy.** By Dr. ALEXANDER F. MATVEIEFF (Riazan, Russia). The author details five successful cases of external urethrotomy, one of which refers to a peasant of 41, with traumatic rupture of the urethra; another to a soldier of 32, with urethral stricture complicated with extensive urinary infiltration; a third to a peasant of 22, with impermeable stricture; and the

remaining two to peasants of 5 and 22, with urethral calculi. Analyzing the series, the writer lays down the following propositions:

1. External urethrotomy belongs to the category of operative procedures which are very easy in technical regards and do not require any special or complicated instruments.
2. The operation enables the surgeon to successfully cope with such vitally grave complications as urinary infiltration of tissues.
3. In cases of rupture of the urethra the operation constitutes almost the only means for curing the patient.
4. Even in cases of urethral strictures an external urethrotomy should be preferred to an internal one, since (*a*) the former allows the surgeon to distinctly see what and how he cuts into; and (*b*) the operation makes superfluous a consecutive dilatation of the channel which is necessary in the case of internal urethrotomy.
5. In cases of foreign bodies in the urethra external urethrotomy should be preferred to a forcible mechanical extraction, since (*a*) the latter procedure occasionally fails to attain its aim; and (*b*) it always leaves behind more or less considerable erosions or contusions of the parts.—*Khirurgicheskaia Letopis*, No. 2, 1891, No. 2, p. 151.

VALERIUS IDELSON (Berne).

#### BONES.—JOINTS.—ORTHOPÆDIC.

##### On Myositis Ossificans. By DR. FRITZ CATEN (Greifswald).

True ossification takes place in muscle-tissue at a point extending from the periosteum, as hyperproduction of the ossification normally occurring in tendons extending to the muscles, or as new bony formation occurring in the muscles themselves. This latter may or may not have a superficial connection with the periosteum, and is the form, strictly speaking, termed *myositis ossificans*.

Agreement has not yet seemed reached as to the genesis of the process. Recent writers, Ziegler, Boiset, Hirschfeld, and others, dispute the view of Virchow that the process was on the border line between inflammatory and neoplastic, and incline to the belief that it is of the nature of a true tumor. This belief is shared by Cohen, who characterizes the histological condition of the specimens examined by him not

as a chronic inflammation of the muscular tissue going on to ossification, but as a true neoplasm. Of the 4 cases observed by the author in the clinic of Helfrich one is of special interest, in that removal was followed by recidive. A man of 35 years was kicked on the left thigh by a horse. After ordinary treatment a swelling to size of a fist remained, which, while decreasing in size, increased in hardness. On removal it was found to be adherent to the periosteum of the femur, from which it was removed by the raspator. Recurrence in the rear nine weeks later, and again recurrence after this second removal. As final report was made only a few weeks after the third operation, we are in doubt as to the ultimate result. In view of the recidivity in this case, however, Helfrich's carefully formulated opinion demands especial attention. He avers: 1. That not only the bony swelling but also the entire thickness of the muscle—when anatomically feasible—shall be excised, so that all changed tissues may be removed. 2. That the apparently normal periosteum be excised, at least over an area, 1 cm. distant from the parts involved. 3. That after removal of the periosteum the underlying bone be chiselled away, deeply in the compact tissue. Only through such radical procedure may one be assured against recurrence.—*Deutsche Zeitsch für Chirurgie, Bd. 31, Heft 3 and 4.*

CHAS. A. POWERS (New York).

## REVIEWS OF BOOKS.

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SURGERY: A PRACTICAL TREATISE, WITH SPECIAL REFERENCE TO TREATMENT. BY C. W. MANSELL MOULIN, M. A., M. D. Oxon., F. R. C. S. Assisted by Various Writers on Special Subjects, with 500 illustrations. Philadelphia: P. Blakiston, Son & Co., 1891—pp. 1180.

The ideas advanced by Dr. Moulin in regard to sapræmia septicaemia and pyæmia differ somewhat from those generally held by writers on surgical pathology. For instance, sapræmia is considered due to a non-infecting organism and is caused by the absorption from the surface of a wound of some ptomaine formed during fermentation. Probably the particular variety is not always the same, and certainly putrefaction with the formation of offensive gases is not necessary."

Senn, on the other hand, regards this condition as "a septic intoxication caused by the presence of dead tissue in the body in a state of putrefaction, from the presence of putrefactive bacilli. The immediate cause of the intoxication is the absorption of preformed ptomaines from such a local focus of putrefaction," and the view is further sustained by Roswell Park, who says it is due to a "putrid suppository from which absorption is continuously taking place."

Septicæmia, Moulin considers "an acute specific disease caused by a micro-organism which multiplies in the blood, so that the most minute trace can communicate by inoculation, as in the case of anthrax" while pyæmia is an infective disorder caused by the ordinary pyogenic micro-organisms and distinguished from the other affections to which they give rise by the unusual prominence of some of the clinical and pathological features. It is not a specific disease; there is no evidence that other organisms than the ordinary pyogenic ones, the staphylococci and streptococci, are ever present."



Here the views expressed are decidedly at variance with the generally accepted theories in regard to these conditions that "the difference between septicæmia and pyæmia is not one of toxæmia, but of formal progression of a series of embolic disturbances, which give rise to the formation of metastatic foci and abscesses." Senn declares that septicæmia is "clinically and probably etiologically closely related to pyæmia," while in regard to the bacterial origin of septicæmia this same author says: "This disease can be produced by any of microbes, which, after their introduction into the organism have a capacity to produce a sufficient quantity of phlogistic ptomaines to give rise to septic intoxication." Senn further says of pyæmia, "its occurrence depends upon an extension of a suppurative process from the primary seat of infection and suppuration in different organs by the transportation of emboli infected with pus microbes through the systemic circulation."

There are two views with regard to the pathology of tetanus, one that it is due to an abnormal condition of a peripheral nerve, which either extends directly to the spinal cord or causes general reflex spasms; the other, that it is due to some poison excreted by an animal organism. "Although there is a certain amount of discrepancy, the balance of evidence is distinctly in favor of its being due to a form of bacillus living in moist earth widely distributed and closely associated with the bacillus of putrefaction, so that it is exceedingly difficult to obtain a pure cultivation.

It is considered questionable whether an operation should ever be performed during the continuance of shock. In regard to primary amputation, it is considered best to stop the hemorrhage, prevent decomposition by wrapping the limb in a dressing saturated with a strong solution of corrosive sublimate and wait until reaction is fully established. When in this condition an operation will almost certainly prove fatal, and even when reaction is commencing the same result is highly probable." An exception to this rule is taken in wounds of the abdomen with hemorrhage. When operation must be undertaken without delay, chloroform given in small quantities is considered equally safe with ether in this condition. In the treatment the main reliance seems to be placed in the natural, almost un-

aided recuperative powers of the patient. Heat is advocated with small quantities of stimulants at half-hour intervals. Ammonia and ether may be employed by hypodermic, if necessary, but digitalis strychnia "and other drugs from which much was expected, have all proven fallacious." The author has apparently overlooked the beneficial results obtained from large doses of strychnia and nitro-glycerine. In his condemnation of transfusion, which he says "in cases uncomplicated with hemorrhage is of very little use," he must have fallen into the common error of using too small an amount of fluid and not making certain that the heart is supplied with a sufficient quantity of circulating medium to make up for the loss due to the distension of the arterioles and consequent increase in blood throughout the systemic circulation until the nervous system reasserts itself and vaso-motor control is once again established.

In the treatment of varicose veins the palliative and radical methods are both described. Little confidence is placed upon any permanent benefit following palliative measures. The ordinary silk elastic, compressing anklets or stockings are condemned, and preference is given to bandages of thin flannel, donet or perforated rubber, "as they can be put on with just sufficient pressure."

In the radical methods of treatment preference is given to excision over acupressure or ligation, and where the involvement is so extensive as to contraindicate excision of the whole of the varicose vein and its branches, excision of the isolated tumors is advocated. The other two methods are, however, detailed, and may be employed in certain cases. The necessity of subcutaneous incision of the vein between the pins or ligatures may be questionable, although it undoubtedly increased the certainty of the cure without materially increasing the difficulties of the procedures.

Of the methods of producing coagulation in aneurisms by means of the introduction of foreign bodies into the sac, iron wire he thinks seems to afford the best prospect of success, and adds that inasmuch as it has only been employed in desperate cases of internal aneurism it should not "be judged too harshly;" but although it has been partially successful, "it cannot be recommended until all other methods have been exhausted." It is suggested that since in Loretta's case, the

most successful yet reported, only six feet were employed, the other early cases may have failed in consequence of the use of too much wire. The employment of the continuous current in connection with the procedure is deprecated, because without it "coagulation appears to have been induced with sufficient rapidity."

In the treatment of tubercular adenitis no mention is made of the iodoform injection method. It is advocated to first try constitutional treatment—the incision, if it is at all possible, to remove the affected glands, or if softening and suppuration have already taken place to use the actual cautery, or scrape out with Volkmann's spoon. Where union is delayed and danger of tubercular sinuses seem great Treves' splint, to keep the neck absolutely at rest, is advocated. Some mention should have been made of the improvement following, in the majority of these cases, where the poison has as yet only attacked single regions, even though they are very largely involved, of incision and removal of the masses within the reach of the surgeon, thus placing the patient in a position to regain his constitutional vigor and by that means prevent the general infection which threatens him.

Club-Foot is treated in a scientific manner, and the author has skillfully avoided the rancorous debate going on among orthopaedists in regard to the advisability or non-advisability of operative procedures in these cases. He has taken a middle position, based upon rational and practical principles, and in consequence has given a chapter on this subject that is perfectly safe, and which, if his treatment is persisted in, will yield excellent results.

He does not advocate open section (Phelps' method) because while it is claimed to be more thorough and complete, without being more dangerous, he thinks this questionable, and doubts whether "the supposed advantage this possesses is sufficient compensation for the time the wound takes in healing." The method of rapid reduction after tenotomy is believed to be the best, and he states that "unless the case is very severe the foot is practically unfolded by the end of the fourth or fifth week."

The various operations of tarsectomy are briefly detailed and are considered "vastly superior to amputation or to progression upon the dorsum with the great toe projecting upwards, a condition not

uncommon among relapsed cases ; but the necessity for these operations would not arise if they were properly attended to in infancy."

The advantages of the immovable as compared with the movable dressing in fractures would be very great were it not for the one disadvantage of inspection of the parts being impossible. The possibility of overcoming this danger by the use of a pad of cotton wool surrounding the limb is considered, but the cutting down of the apparatus or its application in two parts is probably preferable.

The advantages of this method of treatment are decided—reduction is immediate ; there is no spasmodic contraction ; the extravasation is kept within bounds ; blebs cannot form, and a check is placed upon the inflammatory swelling. But the pads must fit accurately and be thick enough ; the pressure must be soft and perfectly uniform, and the case must be in at least two pieces, so that it can be removed easily and at once if there is any fear of congestion or any need for readjustment. This treatment is not advocated for fractures of the femur unless they are the transverse fractures of childhood or infancy.

The same objection may be urged to this plan as to the various open plaster splints. They require more time in their application and a greater amount of experience and manual dexterity.

In compound fractures it is advocated to change the wound into a surgical one as soon as possible. This, however, is not sufficiently emphatic ; too much latitude has been given here and too much stress laid upon the possibility of the wound being such as to prevent union. If the wound in the skin is enlarged, and contused and lacerated tissues removed, it is undoubtedly possible, in a vast number of cases, to reduce the condition to one favorable for primary union under ordinary circumstances, and there is no reason why such injuries should not be treated in the same way as any other injury involving the soft parts. It is to be hoped that in the next edition of this work, and it will reach another edition, this section will be rewritten and this more rational method advocated more earnestly.

The abscesses of hip disease should be opened and drained exactly as abscesses in other parts of the body. In this, as in other points in orthopædic practice, the advice differs radically from that

given and followed, with good results, by several of our leading specialists. But there can be but little doubt that from the general surgeon's standpoint, at least, all principles of treatment point in this direction. Often hectic and amyloid degeneration may be prevented if these regions are only treated according to accepted surgical rules, and it is a well recognized fact that these advocates of an ultra-conservative course of treatment find many instances of amyloid degeneration among their best cases.

In the treatment of tubercular diseases the injection with iodoform emulsion is suggested but deprecated in consequence of the dangers of iodoform poisoning. There seems to be but little danger from poisoning if care is taken to apply the well-known tests for the drug, and its beneficial effects in tubercular lesions seems undeniable.

In cases of compression of the brain from hemorrhage of the middle meningeal artery trephining is advocated. Ligation of the external carotid has not been done often enough for the relief of this condition to recommend the measure.

The following limitations are thrown around operations for intracranial tumors: "Localization must be very exact; the site must be accessible; the size of the tumor must not be too great, or the lesion left may be practically as bad, and there must be no other growth or disease." "Success is naturally more probable when the tumor is surrounded by a capsule than when it is of an infiltrating nature, but this is rarely possible to determine beforehand." The replacing of the whole button of bone or of small pieces is advocated.

Morton's method of treating spina bifida is preferred. "Excision of the sac is only successful in cases of simple meningocele, but as it is impossible to prove that the spinal cord is not involved in the sac this operation should very rarely be undertaken." In cases of fracture of the spine by indirect violence operation offers little or no hope, but in those produced by direct violence the disability may be caused by a simple and slight compression of the depressed laminae, and in these cases operation should undoubtedly be performed at once.

In abscess accompanying spinal caries incision should be performed "early and freely." Leaving them only enables them to become larger and more complex in shape and an imperfect incision is a premium on putrefaction. Aspiration is of little service. If the interior of the abscess is of any size and irregular in shape, it should be opened into every pouch, that it may be not only successfully emptied of its contents but kept empty. If this abscess is thoroughly drained all the parts will heal up to a single sinus leading directly down to the diseased bone. The interior should be explored with the finger to ascertain, as far as possible, its extent and whether the disease which has given rise to it is within reach of treatment, but it should not be scraped out for fear of hemorrhage and of damaging important structures running in the wall or across the cavity, or washed out with antiseptics; then a very large drainage tube should be inserted, or, if necessary, more than one, and absorbent dressings applied."

Psoas abscesses should always be opened in the lumbar region as well as in Scarpa's triangle. Macewen's cases of lamneotomy are the only ones referred to, and the operation is advocated in cases that follow Macewen's rule. Later statistics have modified these restrictions and enlarged the field of operation. Thorburn's statistics are quoted in considering the general questions of trephining the spine, without comment.

The term appendicitis is not recognized, but in its place the old uncertain method of grouping all the inflammations of the appendical region under the name of perityphlitis is retained. The importance of this condition is not emphasized, and McBurney's point, as a means of arriving at a diagnosis, is ignored. In the treatment the incision through the abdominal wall parallel to Poupart's ligament is advised. Aspiration in these cases is not condemned severely enough, and apparently the author was ignorant of the important data collected by numerous surgeons in this country on the pathology, symptomatology and treatment of this condition. This is the only part of the work, except the chapter on intestinal surgery, where lateral anastomosis is overlooked, that deserves condemnation. Both these portions of the work are incomplete and



misleading, and must be completely rewritten to enable them to furnish any information of value, either to the student or practitioner.

The proof-reader has at times nodded throughout the book so that a number of misprints appear, some of which might be misleading, as, for instance, partial incision, when excision is intended.

The book as a whole deserves hearty commendation and a wide circulation.

SAMUEL LLOYD.

ANNUAL OF THE UNIVERSAL MEDICAL SCIENCES. Edited by CHARLES E. SAJOUS, M. D. Philadelphia: F. A. Davis, 1891.

The *Annual of the Universal Medical Sciences*, for 1891, is at hand. The amount of work represented in its pages is enormous, involving, as stated on the title-page, the services of two hundred and seventy associate editors and collaborators in addition to the editor-in-chief, Dr. Sajous. With the latter rests the responsibility and the credit. It is no small thing to give abstracts of all notable papers, home and foreign, which appear during the year, in every branch of medical science. Yet this is the undertaking, and of more importance, it is accomplished.

The five volumes of the Annual furnish just what every reading physician desires, and would do for himself if time permitted, at least in the particular branches which are of most interest to him. In view of the volume of medical writing which is in circulation, this is an impossible undertaking. One should therefore be grateful to have it done for him on the coöperative plan by gentlemen abundantly competent for such tasks, and whose respective judgments are sufficiently matured to separate the gold from the worthless matrix.

Volume III., as giving the results of a year's work in surgery, is of especial interest.

Surgery of the Brain, Spinal Cord and Nerves, in charge of John W. Packard, embraces fifty-four pages. Linear Craniotomy is the most striking and radical of proposed and executed operative measures under this heading. Operations for tumor and abscess of the brain, intra-cranial hemorrhage, and epilepsy are abstracted in startling

numbers, each case sufficiently reported to enable the reader to understand the indications for and the character of the operation. Fractures and other injuries of the cranial bones receive due notice. The surgery of the spine is enlarging, as evidenced by reports of cases. Under surgery of nerves some very interesting instances of successful nerve grafting appear. In one of these cases two and one-half inches of median nerve was, from an amputated arm, used to fill the gap left in another median nerve by the removal of a tumor.

The section on Thoracic Surgery contains some interesting abstracts of cases and discussions. Penetrating wounds, foreign bodies in the air passages, operative measures for pleural effusions, and pneumonotomy are quoted in sufficient numbers to furnish profitable reading.

As usual, a large number of papers on Abdominal Surgery have appeared and have been thoroughly epitomized by J. E. Mears. The surgical treatment of peritonitis, both septic and tuberculous, is illustrated by a number of cases. Plastic operations on the stomach and intestines are multiplying with some brilliant results. This section is pretty thoroughly illustrated, mainly with reference to newly-devised plates for enterostomy and resection of the intestine. An interesting condensation, well illustrated, of Godlee's lectures on Hepatic Abscess appears. A proper amount of space is allotted to the surgery of the pancreas and spleen and to the operative treatment of hernia.

The *résumé* of Diseases of the Rectum and Anus, under C. B. Kelsey, is devoted mainly to the formation and closure of artificial anus, fecal fistulæ, and the surgical treatment of extensive prolapse of the rectum.

Surgical Diseases of the Genito-Urinary Apparatus in the Male, in charge of E. L. Keyes, deals in the main with details of old methods, showing a marked tendency to employ antiseptic methods in this department. Supra-pubic cystotomy evidently grows in favor, and litholopaxy in children shows great advance.

J. W. White claims forty-four pages for items and papers relating to syphilis. Half the space is devoted to Orthopædic Surgery, by L. A. Sayre. P. S. Connor provides the section on Amputations, Excisions, and Plastic Surgery, together with Diseases of Bones and

Joints. Fractures and Dislocations, by L. A. Stimson, and Diseases and Injuries of Arteries and Veins, under J. H. Packard, are next in order. There has evidently been unusual activity in Oral and Facial Surgery, if one may judge from the amount of space, seventy-six pages, reserved for the abstracts in this line by R. Matas. A catalogue of the remaining sections must suffice, which runs thus: Surgical Diseases, by L. McL. Tiffany; Traumatic Neuroses, by E. C. Seguin; Surgical Dressings and Antiseptics, by J. H. Packard; and Anæsthetics, by J. M. Barton.

The valuable indices to each volume, supplied by C. L. Witherstine, should not be forgotten.

In fine, the plan is large and comprehensive; the execution admirable; the result well worth having, and the editor-in-chief is to be congratulated.

GLENTWORTH REEVE BUTLER, M. D.

## INTRAVENOUS SALINE INFUSION FOR RELIEF OF SHOCK AND ACUTE ANÆMIA.<sup>1</sup>

By LEWIS S. PILCHER, M. D.,

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IN bringing the subject of intravenous saline infusions before the profession again, I am aware that the merit of novelty does not attach to it. The conditions of the circulation which render its practice valuable have been thoroughly studied and are well established; the practical results of its application have been fully demonstrated, and the technique of its practice is simple and well understood. Nevertheless, I am persuaded that the recourse to such infusions is not as frequent as it might be with advantage to patients suffering from the shock of injury and the loss of blood; that the possible difficulties that attend its practice are not infrequently exaggerated in the minds of practitioners; and too often it is regarded as one of the rarer resources at the command of surgeons in great hospitals rather than one of the possible helps easily at the command of the general practitioner.

For these reasons I have ventured to report the following cases from recent personal experience, that if possible they may serve to renew interest in these infusions and again emphasize their value and practicability.

Rapid hemorrhage, when sufficient in amount to compromise life, produces its harmful effects, not by the reduction of the amount of the vital elements of the blood in the vessels below a point sufficient for maintaining life, but by so reducing the pressure of blood within the vessels as to render its adequate circulation impossible. The dominating indication is to quickly restore the volume of the circulating fluid to that point which will make possible the continual action of those forces by which its continual flow through the vascular channels is carried

<sup>1</sup> Read before the New York State Medical Society, Feb. 4, 1892.

on. It is, therefore, now one of the accepted tenets of physiology, to which the labors of many have contributed, that, in efforts to resuscitate those dying from hemorrhage, the essential requirement is to fill the elastic tubes of the vascular system with a certain amount of fluid, not necessarily blood, and that all the benefits derivable from blood transfusion may be obtained by the simple device of infusing into the veins a solution of common salt.

In cases of injury that present themselves to the surgeon in actual practice varying degrees of shock and hemorrhage are likely to be combined. I would divide them roughly into three classes :

1. Those in which the effects of hemorrhage predominate.
2. Those in which hemorrhage and shock are both present in marked degree.
3. Those in which shock predominates.

Of the first-class I will recite but one case in brief outline, as follows :

Male. Aged 37 years. Suicidal gash of throat. Profuse hemorrhage. When received for treatment pulseless, voiceless, unconscious, moribund—no reaction to heat and hypodermic administration of stimulants. At end of forty-five minutes infusion into radial artery of twelve ounces of salt solution. Immediate return of pulse—progressive improvement—subsequent amenability to ordinary stimulants. Rapid and complete recovery.

As to the value of infusion in the second class, I present the following examples :

1. Male. Aged 22 years. Pelvis crushed by a falling bank of earth. Fractures of pelvic bones; laceration and extensive blood infiltration of soft tissues of pelvis; laceration of urethra; median perineal section; suprapubic cystotomy; free counter openings into pelvic tissues for drainage in perineum.

Patient developed symptoms of profound shock, combined with those of acute anæmia, accompanied by restlessness and thirst; surface of body cold, pulse too rapid and weak to be counted. Continuous and uncontrollable capillary oozing of blood from his wounds.

Twenty ounces of saline solution infused into the median basilic vein. Immediate improvement in his pulse and general condition

followed. But after some hours the good effects of the infusion seemed to have become exhausted. The heart's action again became feeble and rapid, and restlessness and thirst re-asserted itself. The capillary oozing, however, had now become checked. Hypodermics of morphia, atropia, digitalis and strychnine, and of whiskey began to manifest power to steady and sustain the heart. Renewed improvement declared itself, which from this time steadily progressed. His wounds were healed, his urethra restored, and an absolute recovery secured.

2. Female. Aged 17 years. Operation for removal of multiple tubercular adenomata of neck, mass filling right side of neck from mastoid process to clavicle. Operation prolonged by reason of extensive periglandular thickenings of the connective tissue and the cheesy degeneration of many of the glands. Near the close of the work, while traction was being made at the root of the neck to expose a gland in the supra-sternal fossa a flood of venous blood suddenly inundated the wound, and added the effects of its rapid loss to the previously existing shock and anæmia. The depression was profound and threatening of speedy dissolution. While the lateral tear in the internal jugular vein, for such proved to have been the cause of the hemorrhage, was being secured, my assistant proceeded to infuse a saline solution into the median basilic vein. The quantity of solution injected was regulated by its effects, and the injection was continued until the normal volume of the pulse was restored, three pints having been thrown in before the desired effect was obtained. This full beneficial effect of the infusion soon began to wane, and the ordinary symptoms of severe shock reasserted themselves after an hour or so. She responded now, however, to the usual treatment for such a condition; by the succeeding day she had fully rallied, and she passed on to an uneventful convalescence, none the worse for her jugular accident.

3. Female. Aged 46 years. Exploratory incision to determine character of a doubtful knee-tumor. Abundant hemorrhage with demonstration of the existence of a vascular sarcoma of the lower end of the femur. Immediate amputation through middle of thigh. Much immediate shock, with subsequent gradual aggravation of all symptoms. At end of four hours patient pulseless, unconscious, moribund. Infusion into median cephalic vein of one pint of saline solution. Immediate revival. Able to receive and converse with friends for some hours. Gradual relapse into condition of depression, against which the usual stimulating remedies were powerless. Final death.

I might add other examples to these, illustrating the happy



effects of intravenous saline infusions in the two first classes of cases enumerated. But these are quite enough. They are in accord with physiological teachings and the practical experience of many others. In approaching the subject of shock, however, I do not feel that I am standing on so secure ground. The effects of shock are well recognized. What it is—the origin, sequence and connection of the processes which result in the profound vital depression that characterizes its more pronounced types baffles as yet our means of research. The blood pressure falls, the remote arterioles contract, the heart falters. Death outright may occur. Just how the pouring of a quantity of warm saline solution into the right heart may help in overcoming these conditions I will not venture to explain; I will not even claim positively that such infusions will have this power at all; but I have had some experience which seems to indicate such a power, and this I submit in the following cases:

1. Woman. Aged 29 years. Thrown into profound shock by an internal strangulation of bowel. Despite morphia, atropia and stimulants, shock became more profound while preparations for laparotomy were being made, until finally she was pulseless, unconscious, extremities cold, apparently dying. About eight ounces of saline solution were then injected into the median basilic vein. She revived, her radial pulse appeared again with some fullness and strength. Laparotomy was proceeded with. She bore a somewhat prolonged operation, but later sank again into collapse from which renewed infusion was powerless to rally her, and death supervened.

2. Woman. Aged 45 years. Vaginal hysterectomy for carcinoma. General strength already much reduced. Operation embarrassed and prolonged by rigidity of perineum, size of uterus and friability of the cervix. Patient in profound shock at close of operation. Saline infusion to the amount of one quart into median cephalic vein. Usual accessory treatment for shock also applied. Immediate restoration of the pulse. Subsequent gradual general improvement. Uncomplicated healing. Satisfactory recovery.

3. Male. Aged 13 years. Run over by a wagon. Multiple contusions over chest and abdomen. Profound shock. Vigorous measures to secure reaction, including lowered head, external heat, hypodermatic administration of whiskey, digitalis and nitroglycerine, resorted to in vain. Patient's condition became steadily worse. Pulse almost imperceptible, breathing short and gasping, pupils dilated,

consciousness lost. While thus moribund a saline infusion was instituted. When one quart had been injected the pulse had become slower and more full, his gasping respiration disappeared and signs of returning consciousness began to be evinced. The injection was continued until two quarts had been infused, by which time he had become perfectly rational and his pulse 124 per minute. His after history was uneventful. A slow but steady improvement in all symptoms followed, and a perfect recovery was secured.

Most of the cases that I have related occurred in my service at the Methodist Episcopal Hospital in Brooklyn, and the infusions were done by the internes on duty there. The saline solution used has not been the same in all cases, in some a simple six pro mille solution of common salt was employed, in others a more complex formula was adopted, in which an attempt is made to include all the salts of normal blood serum. I do not consider that the latter is at all important, indeed, equally good results have been obtained from the infusion of pure water alone! Wherever a little table salt and some boiled water can be procured, all the material that is requisite has been supplied.

No complicated apparatus is required for the infusion. We have used the well-known Colin's transfusion apparatus because it is convenient and it has been at hand. This comprises only some elastic tubing, a tip and a funnel with a syringe attached to it. The syringe, however, is unnecessary. A glass funnel, two or three feet of clean rubber tubing, and a bit of glass tubing for a tip to introduce into the vein is all the apparatus required.

The exposure and opening of the vein is one of the simplest operations possible, and may be done with the crudest instruments, if better should chance not to be at hand. I would guarantee to do it quickly and safely with a pocket-knife, a bent pin and an ordinary pair of scissors to be found in any house, if the emergency required.

Let me urge the more general and frequent resort to this procedure in all cases of acute anæmia from hemorrhage and of profound shock that does not respond to ordinary stimulation. Let it be remembered that its value depends on the rapid diffusion throughout the circulating apparatus of a considerable volume of fluid, and that for this purpose no other procedure can compare

with it for efficiency. Intra-arterial, intra-peritoneal, rectal, interstitial injections are all subject to great limitations, either as regards the rapidity or the volume with which they can pour fluid into the blood vessels, and are all inferior to the intravenous method.

I am inclined to think that in my earlier cases an error was made in not injecting a larger volume of the solution into the vein. I am not satisfied now that some of my fatal cases would not have terminated differently if a larger volume of the fluid had been infused. Certainly the infusion, when once commenced, should be proceeded with until full reaction of pulse and consciousness is secured, and if later renewed collapse should threaten, it should again be done as boldly and as freely as at first.

## THE CROSSED SUTURE.

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IN MANY operative procedures, when the method of immediately and completely closing the wound is employed, it is quite essential that the several layers of the walls of the incision be brought together separately and perfectly. In some instances, particularly when the attempt is made to bring together the aponeurosis of the external oblique and the edges of Poupart's ligament, in the operation for radical cure of hernia, the tension is so great as to lead one to distrust the buried catgut suture when employed for this purpose. On the other hand, if the operator depends upon including all of the structures comprising the wall of the wound in the suture in the ordinary manner it will quite generally happen that the skin surfaces will be drawn upon, while, at the deeper portions of the wound, considerable gaping occurs.

In order to obtain all the advantages of the buried suture, and yet be enabled to remove the latter at will, at the same time doing away with the necessity for depending upon an absorbable material, always uncertain as to the length of time that it will hold with sufficient firmness in the tissue, I have devised what I have called "The Crossed Suture." It consists essentially of a suture which separately unites the different layers of the wall of the wound, and which is crossed over each layer in turn as it progresses from below upwards from the deeper portions of the wound to the integumentary surface. Either silkworm-gut, silver wire, silk or linen thread may be employed. My own preference is decidedly for the first named. The material is cut to lengths and is threaded at both ends. The thread is secured in the eye of the needle by passing the end of the silkworm-gut, which emerges as the needle is threaded, a second time through the eye of the latter from the same side as that from which it was originally passed.

When the flat Hagedorn needles are used this is not a difficult matter. When the loop which is thus formed is drawn taut the needle is held securely to the thread (Fig. 1). A single knot securing the thread to the needle-eye will serve the same purpose, but has the disadvantage of offering a somewhat greater resistance when the needle is drawn through the tissues, and,

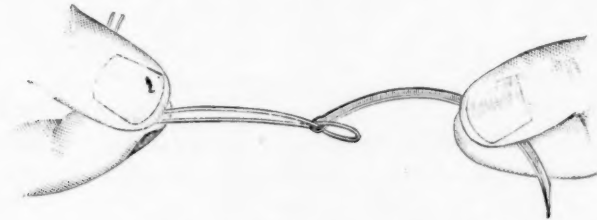


Fig. 1. Manner of threading the needle.

occasionally, as when the serous coat of the intestine is to be included in the suture, leads to a tearing out of the thread by reason of having made an unnecessarily large track in the tissues in its passage.

The thread being attached at both ends to the needles, the

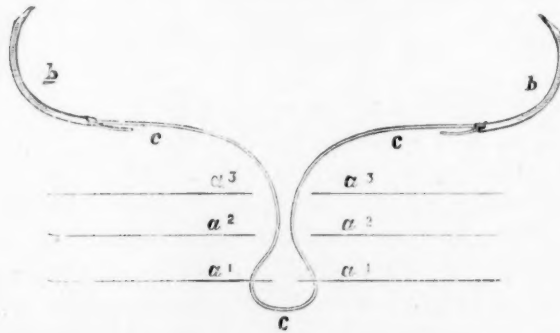


FIG. 2. Showing suture passed through lowermost layer at "a." a<sup>1</sup> 1st layer. a<sup>2</sup> 2d layer. a<sup>3</sup> 3d layer.

latter are passed through the lowermost layer from below upwards, one through each edge of the latter (Fig. 2). The thread is then crossed over the layer, the needles reversing positions. The needles are then passed through the next layer, are again reversed as regards position, thus crossing the thread again and over the second layer to be secured (Fig. 3). This process is repeated

until all the layers are secured, the skin being the last to be included (Fig. 4), when the ends of the sutures are secured in the ordinary manner. A reference to the accompanying diagrams will aid the reader in understanding the method of application.

This suture may be left in position as long as the exigencies of the case demand its presence. In its removal the thread is cut to one side of the knot lying upon the skin in the usual way, and withdrawn by making steady traction upon the other side. It may be employed wherever it is desirable to firmly and securely approximate the deeper portions of the wound independently of the superficial or skin portion, and still permit of removal. In

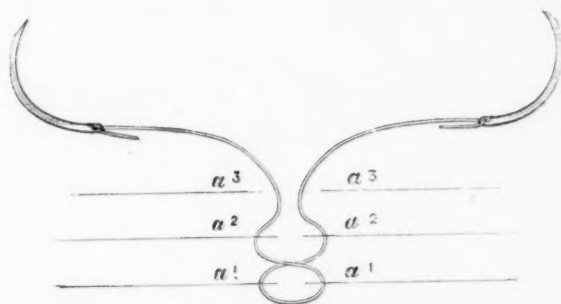


FIG. 3. Showing suture crossed and passed through second layer, from below upwards.

laparotomy wounds it will be found particularly useful, first securing the peritoneal surfaces and then the muscular and skin layers in turn. It is likewise especially advantageous in perineorrhaphy and in uniting divided nerves and tendons. There is an advantage in passing the needle from below upwards, particularly in the case of the skin, whatever method of suturing is adopted, and this consists in lessening the dangers of infection from the deeper portions of the integument itself. When it is remembered that this structure is filled with excretory glands with a scavenger-like function, and that the ducts of these are more or less filled with excrementitious material, in spite of the most vigorous application of the brush and soap and water, which, after all, only cleans the outer surface, the importance of passing



the suture in such a manner as not to drag any of this with it into the depths of the wound will be appreciated.

In passing I might mention a little device which I have found of use in temporarily securing sutures preparatory to tying, and which has saved me much annoyance and valuable time, preventing as it does the entanglement of sutures already

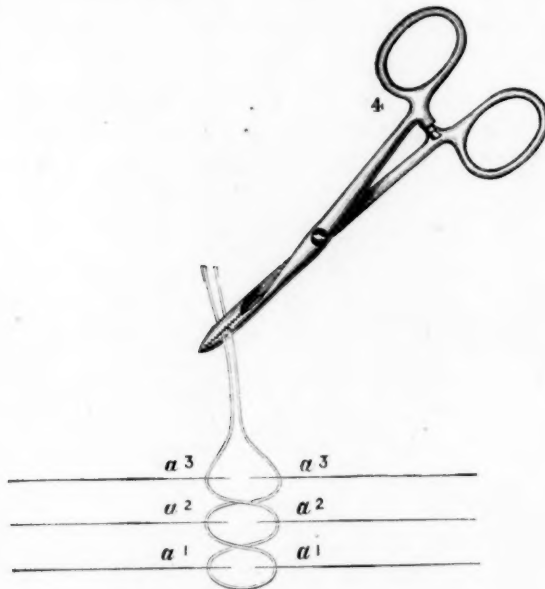


FIG. 4. Showing all three layers included in the crossed suture, ready for tying. "4," ordinary hæmostatic forceps temporarily securing suture for ready identification until all are ready for tying.

passed and left lying loosely pending their final adjustment. It consists in clamping the two ends—these being left sufficiently long for the purpose—of each suture in a separate hæmostatic forceps as soon as passed. As fast as they are clamped they are laid to one side, and when all is ready each suture is unclamped in turn and tied. (Fig. 4.)

NOTE.—Since writing the above my attention has been called to a perineorrhaphy suture described by Heppner and figured in Vol. II., pp. 980, 981, of Pozzi's *Gynæcology*, first edition, which in some respects resembles the "crossed suture."

REPORT OF CASES OF APPENDICITIS TREATED IN  
THE SURGICAL WARDS OF THE COOK  
COUNTY HOSPITAL OF ILLINOIS,  
DURING THE YEAR 1891.

REPORTED BY DANIEL N. EISENDRATH, M. D.

OF CHICAGO.

RESIDENT STAFF, COOK COUNTY HOSPITAL.

**Case I. Acute Catarrhal Appendicitis without Tumor.**

C. R. Printer, aet. 31, admitted 7-7-91; discharged, 7-29-91. Catarrhal Appendicitis. No operation. Recovery. Patient's previous history negative. He had had a colic on right side of abdomen five years before.

His trouble began on July 4th with sudden severe pain in the iliac region, necessitating his going to bed. He was seen upon the same day by Dr. Van Hook and given large doses of morphine. His pain continued of a constant character, increased by pressure and movement, up to time of admission on July 7th, 1891.

Operation was advised, consultant was against it. Examination showed a well nourished, robust man. Tongue slightly coated, no appetite and constipation. There was no tumor apparent on inspection of abdomen, but on palpation there was diffuse tenderness, but most acute in the right iliac region, especially opposite a point midway between the right anterior superior spine and umbilicus. There was some dullness over this area, but no tumor could be felt. He was given morphia, gr.  $\frac{1}{4}$  p. r. n., liquid diet, and bowels moved by enemata until July 11th, when he was given 1 oz. of castor oil. His temperature never rose to  $100^{\circ}$  C. Pulse 86 to 90. The local symptoms gradually decreased, and patient was discharged on July 29th, recovered.

**Case II. Acute Appendicitis with Tumor.** Operation; Resection of appendix; Recovery; A. H., aet., 30, Railroad Switchman. Admitted 7-29-91; discharged 10-21-91. Recovery. Patient had always been in good health until the summer of 1890, when he had a severe serous diarrhoea for several months, from September, 1890, to February, 1891. In November, 1890 he was taken with severe pain in the right inguinal region, which persisted for about ten days. He was in a hospital, and medicine given stopped both the diarrhoea and the pain. Soon after leaving the hospital the former began again and continued until February, 1891. Bowels were regular, and general health from this time until present illness began, which occurred about one week before admission, had been good; he was suddenly taken with a sense of constriction across the abdomen, and shortly after noticed severe darting, stabbing pains in the right inguinal region. This pain persisted, not getting much worse, but not diminishing until the date of admission, July 29th, when it seemed much better. Bowels quite regular.

*Examination.*—Patient located the point of tenderness with his finger at the centre of a line drawn from the right anterior superior spine to the umbilicus, but stated there was little pain there at the time of admission. On palpation here, some, but slight, tenderness was elicited, but a distinct tumor could be felt occupying the right iliac fossa, about the size of a duck's egg or a little larger.

On the morning of August 5th, the patient having been prepared in the usual manner, Dr. J. B. Murphy made an incision three inches long, bisecting a line from the right anterior superior spine to the umbilicus, opened the peritoneum with a scalpel, and came immediately upon adhesions between the peritoneum and omentum, which latter covered and was bound to the seat of inflammation. Stripping easily the omentum from the underlying mass, the ileo-cæcal region was brought into view; the intestines were much congested and adherent. Lying close under the cæcum and adherent to it and to the beginning of the ilium along its lower border was the appendix, congested and swollen to the size of the little finger, and about seven-eighths of an inch long. The free extremity was blind, and had the

appearance of a loss of substance from ulceration. About its base near the cæcum was a small ulcerated opening admitting a probe, and about it were a few spots of beginning suppuration, yet there was no actual pus cavity anywhere. The appendix was ligated close to its base with strong silk and cut off. The mass was then allowed to resume its former position in the abdomen. A piece of iodoform gauze was packed around the stump and carried as a drain through the incision, the extremities of which were closed with silk, and the whole wound dusted with iodoform and a large antiseptic dressing applied.

The patient's temperature on the second day after operation was 101.2° F. Pulse 84. On the third day the temperature being 102.2, pulse 124, the wound was dressed and note made on the history that there was pus about the gauze drain, which was firmly adherent and was not removed. The wound was thoroughly irrigated. The temperature ranged between 99° and 102° until the tenth day after operation, after which it only rose once to 101°, but remained about 99.4°, with pulse between 80 and 90. On August 12th the wound was again dressed and the following noted: There is considerable pus. Removed gauze with some difficulty and also all sutures, as they were infected. A ligature which was applied to a bleeding point in the omentum at the time of operation still remains attached, having by mistake neglected to cut it off, and both ends allowed to remain hanging out of the wound. No further notes are made on the history, but the patient was discharged October 24, 1891, about ten weeks after operation, fully recovered.

**Case III. Acute Appendicitis With Tumor.** Henry Moeller, aet. 31; German; laborer; admitted June 16, 1891, discharged August 13, 1891. Recovery.

Appendicitis. Threatened perforation into peritoneal cavity. Laparotomy. Removal of appendix and enteroliths. Recovery.

Patient was well up to thirty hours before admission on June 16, 1891, at 2 P. M. On the previous day had a bowel movement shortly after getting up, and felt well until 8 A. M., when he lifted a heavy weight and noticed a sharp colicky pain referred to the umbilical region. This did not return until 7 P. M. the same day, more severely,

and continued in moderate degree up to the time of admission. At 8 P. M. on the previous day and 1 A. M. of the next he vomited greenish and bitter material. He had a slight bowel movement upon the day of admission. He consulted Dr. Van Hook at the Post Graduate Medical School, who sent him to the hospital for operation.

Examination at the time of entrance to the hospital showed patient *sallow*, dull and sleepy. Complained of a chilly sensation, and stated that he felt better when his legs were drawn up and adducted, as it hurt him to breathe deeply with his legs extended.

Examination of abdomen.—Percussion, even light, and superficial palpation were almost impossible on account of the extreme tenderness, especially in the right iliac region, but a small tumor could be felt there.

Operation 7 P. M., July 16, 1891, forty hours after beginning of illness. Three-inch incision parallel to Poupart's ligament midway between the umbilicus and the anterior superior spine. After incising the peritoneum the enlarged appendix could be easily felt and brought into the wound. Easily broken down adhesions had formed between the surrounding coils of intestines, the first stage in the formation of an abscess cavity. The appendix was examined, and a greenish white spot about the size of a dime seen at about its centre, directly opposite or over a somewhat firm foreign body imbedded in the lumen. The entire appendix was removed after ligation, close to the cæcum; the edges were invaginated and closed by Lembert sutures, after cleansing the stump with ninety-five per cent. carbolic acid and suturing it to the omentum, thus providing an omental covering for it. The wound in parietes was sutured. No drainage inserted. Examination of the appendix after the operation revealed the presence of two small-cherry-stone-size enteroliths, which are now in the possession of Dr. Van Hook. Several days after the operation a small amount of pus was discharged from the centre of the incision, and this was thought to be due to local infection, caused by a drop of the contents of the appendix falling on the edge of the wound. This still remained as a small sinus until July 1, 1891, when a superficial granulating surface re-

mained, but on pulling out a long piece of silk this closed up entirely, and the patient was discharged August 18th, recovered.

**Case IV. Acute Appendicitis Without Tumor.**

Aet 19, Swede. Appendicitis. Perforation. Septic Peritonitis. Laparotomy. Death fifty-two hours after operation. Patient was unable to speak English, and only the following previous history could be obtained: About one week before he began to have a severe diarrhoea, which continued up to the time of admission. About thirty-six hours before he began to vomit, and this symptom was also present when admitted.

Examination on admission showed patient was cold and clammy; features pinched and drawn; profuse perspiration; face livid; tongue heavily coated. At intervals of a few minutes he vomited a greenish material with a very fetid odor. Pulse rapid, soft and feeble. Lungs negative. Abdomen tympanitic; walls tense. Liver dullness absent. He complained, or indicated, that he had intense pain in the abdomen, especially on the right side. There was no induration in the region of the appendix, and nothing definite could be outlined on account of the tympanites.

Operation, two hours after admission, by Dr. Moorhead. Chloroform. After the usual preparations the incision for the lateral operation for appendicitis was made, but nothing definite found. An incision was then made in the median line, and, upon opening the peritoneal cavity a large amount of fluid faecal matter escaped. The coils of intestines were markedly congested and covered with flakes of fibrinous lymph. They were carefully inspected for perforations, but, none being found, the appendix was examined and found bound down by plastic adhesions behind the caecum, having a perforation at its centre about four millimetres in diameter. The appendix was ligated by transfixion and removed, the stump being invaginated and closed by Lembert sutures. In the interior of the appendix and on the proximal side of the perforation was a firm faecal concretion about eight millimetres in diameter, somewhat almond-shaped, with its apex directed toward the perforation, occupying the entire lumen of the appendix, which was about the size and



length of the index finger. Both median and lateral wounds were closed by superficial and deep sutures of silk, and a glass drainage tube inserted into the lower angle of the median wound, the peritoneal cavity having previously been thoroughly flushed out with three gallons of hot ( $108^{\circ}$ ) sterilized water. The usual dressings were applied. The patient was removed from the table markedly improved. Four hours afterwards his temperature was  $98.6^{\circ}$ ; pulse, 120. The drainage tube was aspirated every two hours, and stimulants freely given. A saline enema upon the following morning was successful. Pulse remained 116 to 120. He was able to retain ten ozs. of hot milk during the first twenty-four hours, and only had an occasional hiccough. About twenty-eight hours after the operation, during the absence of the nurse, the patient pulled out the drainage tube (through which about two ozs. of clear, non-offensive fluid had been aspirated) and got up out of bed, and when discovered was almost in a state of collapse. His pulse now rose to 160, and temperature to  $101.6^{\circ}$  axilla. He took about one pint of milk during the next twenty-four hours, and was given sulph. magnes. 2 drs. every two hours, with several successful saline enemas. Several times during the last twenty-four hours notes are made of flaky matter withdrawn by aspirating the drainage tube. Patient died at 8 P. M., October 6, fifty-two hours after operation.

**Case V. Acute Appendicitis, without Tumor.** F. D., porter, aet. 32; admitted 8-10-91 at 2.10 P. M. Died 8-11-91 at 1 A. M. Acute Septic Peritonitis from Perforative Appendicitis. Laparotomy. Death. Had enjoyed excellent health until three days before admission, having suffered only from chronic constipation for two years. On this day he was taken with severe pain in the umbilical region, which rapidly increased in severity. Two days prior to admission he was seen by Dr. Whitwer, who gave an enema and repeated doses of salts, his bowels not having moved for several days. These were somewhat successful, but upon the following day he vomited several times. The pain still persisted with increased severity.

Examination upon admission showed a robust, well-developed negro, with face pinched and drawn, anxious expression, eyes sunken;

pulse rapid, weak and wiry, thighs flexed on abdomen. On percussion could demonstrate the presence of free fluid in the peritoneal cavity. The abdominal walls were tense and rigid; there was tenderness on pressure over all parts of the abdomen, not more severe in one region than another.

8.10 P. M. Laparotomy by Dr. J. B. Murphy. Ether. Patient's vomit was now stercoraceous; he was in a state of collapse necessitating the administration of stimulants, and also operation almost without anæsthesia. An incision was made in the median line three inches long between the umbilicus and pubes. As soon as the peritoneal cavity was opened a large quantity of sero-purulent flaky matter with faecal odor escaped. The appendix was felt enlarged, surrounded by recent adhesions to neighboring viscera and parietes. The condition of the patient permitted only of a thorough lavage with hot sterilized water and the insertion of a large gauze drain reaching to the ileo-cæcal region. No sutures. He was quickly placed in bed and all stimulants, etc., employed. He recovered consciousness and remained mentally clear up to time of death, five hours after operation, or eighty hours after the beginning of his illness. A post-mortem examination was not permitted, but the cæcum and the appendix, which had been secretly removed shortly after death, showed the appendix enlarged to the diameter of and in length equal to the little finger. It was firmly adherent to the under surface of the cæcum, with the exception of one-half inch of the tip, which was free. At the base and also one-half inch above the apex were two ulcerated perforations. At the site of that at the base was an enterolith about the size of a cherry-stone, hard and brownish-red. There was no abscess cavity around the appendix, peritonitis having succeeded immediately upon perforation, before adhesions could be formed.

**Case VI. Acute Appendicitis, with Tumor.** M. K., aet. 40. U. S. Admitted 10-1-'91. Discharged 11-11-'91. Recovery.

*Previous History*, negative. Had always enjoyed excellent health up to beginning of the present trouble.

*History of Present Illness.* Two weeks before began to have pain

in the right iliac region, with constipation, persistent vomiting and a chill, compelling him to go to bed. Abdomen became tympanitic. Pain and other symptoms continued unchanged to time of admission.

*On Admission.* Patient pale, slightly emaciated; looked like one suffering from some acute illness. Pulse 96, small, wiry and soft. Temperature, 99.4.

*Abdomen.* Some tympanites; extreme tenderness on pressure, and a sense of resistance to palpation in the right iliac region, to which area patient referred the pain he had during the past two weeks. There was dullness on percussion over this area, but no redness of skin. Examination per rectum was negative. On deep palpation, in addition to the above sense of resistance, there was also one of faint fluctuation.

*Operation* two hours after admission by Dr. W. Van Hook. Exploring needle inserted into the fluctuating swelling revealed the presence of pus. An incision was then made through all the tissues of the parietes parallel to Poupart's ligament until the peritoneum was incised, when pus and gas, with feculent odor, escaped, showing its connection with the intestinal canal. A drainage tube was inserted and the wound dressed every second day. The temperature after operation varied between 99.8° to 100.4°. Patient was kept on liquid diet until eighteen days after operation, when he was given light diet. No further notes were made on the history sheet of the progress of the case, but the patient was discharged November 11, 1891, recovered. The condition of the wound during this time was as follows: Drainage tube was left in for two weeks, then packed to bottom at each dressing with iodoform gauze, healing rapidly by granulation from the bottom. On the day of discharge there was only a cutaneous scar.

**Case VII. Acute Appendicitis, with Tumor.** O. P. P., glazier. Admitted 4-6-91. Periappendicular Abscess. Operation. Removal.

*Present Illness* began November 3, 1890, when he had great pain in the abdomen and in the testes; vomiting, retching and marked constipation. A week after this an abscess developed in the right

groin. This was evacuated, and discharged faecal matter and pus for three weeks. This healed, but reopened two or three times, and when admitted on April 6, 1891, examination revealed a puckered cicatrix and a slight bulging in the right iliac region—a very narrow sinus which was not probed. The patient was prepared for operation, and an exploratory incision three inches long, made parallel to the puckered scar and nearer the median line, so that its course was parallel to Poupart's ligament and about midway between the umbilicus and right anterior superior spine. The peritoneal cavity was opened and the ileo-cæcal region examined. All the viscera of this region were found so closely adherent to each other and matted together, being walled off from the general peritoneal cavity by adhesions formed between the coils of intestines, the cæcum and the parietes, that it was deemed advisable to close the incision again. This wound healed throughout by first intention in spite of its proximity to the constantly discharging sinus. The patient was sent out, at his own request, on May 3, 1891, four weeks after the exploratory operation. He returned to the hospital on May 19, 1891, the sinus in the right iliac region still continuing to discharge a small amount of pus. A radical operation being decided upon, the patient being prepared, a large opening was made with the probe in the sinus as a guide. A large mass of granulation tissue was found lining the sinus, and from this main one numerous blind smaller sinuses led in all directions. After careful dissection and search, with free exposure of the field of operation, the vermiform appendix was found, ligated and cut off; its edges being invaginated and oversewn; two enteroliths were found in it the size of peas. A large rubber drainage tube was inserted and a counter-opening made over the crest of the ilium. All of the operation was done either extraperitoneally or in a part of the general peritoneal cavity, which had been walled off by adhesions—the latter is more probable—on account of the evidence obtained in the exploratory laparotomy performed five weeks previously.

No further notes are made until July 7, 1891, when a small sinus remained leading down into the iliac fossa at the site of operation, and posteriorly a small sinus at the site of counter-opening. He was

discharged on July 17, 1891, and returned for a few months, at intervals, to be dressed.

**Case VIII. Acute Appendicitis, with Tumor.** W. B. aet. 27; Engineer, U. S. Admitted 7-20-91 at 8 P. M. Discharged 9-6-91.

Appendicitis and Periappendicular Abscess resulting from the lodgment of a gelatine capsule in the appendix. Operation. Recovery.

*Previous Illness.* States that he had attacks of ordinary intestinal colic at intervals during the past few years, but otherwise had enjoyed perfect health up to time of

*Present Illness,* which began seventy-eight hours prior to admission, as follows: He was a night engineer by trade, and slept during the day. He awoke at two o'clock on the afternoon of July 17th, 1891, on account of a colicky pain in the umbilical region, which also passed up and down his abdomen. He consulted a physician, who prescribed some liquid medicine and some other to be taken in capsule form at bedtime. Of the former he took one teaspoonful and soon vomited, but the pain in the abdomen had entirely ceased. At 6 P. M. of the same day he took one of the capsules, and this he stated positively was the only one of these he had taken. He did not go to work on that evening, and was awakened upon the following (Saturday, July 18th, 1891) morning by a second and quite different variety of pain, of a constant, throbbing, cutting character, referred to the right iliac region. The other umbilical, colicky pain also returned at intervals. He did not consult a physician again until a few hours before admission, the pain having continued unchanged, necessitating his taking to bed. During this interval he had not vomited, taken scarcely any nourishment, and he had only one scanty bowel movement.

Upon admission, 8 p. m., July 20th, 1891, patient was a well-nourished man. His walk was noticed at once to be accompanied by expression of pain, and examination revealed an area about three by three inches situated chiefly in the right iliac region but extending

over into the hypogastric region, over which there was the most exquisite tenderness to the touch, a marked sense of resistance, as though one were palpating an area of the erysipelatous inflammation, with dullness on percussion and reddened condition of the skin, quite sharply limited to the above area. The patient stated that this subjective sensation of a constant pain had been entirely in this spot. Deep palpation and percussion were impossible. Tongue coated, no appetite, constipated, pulse 108, moderated and soft, temperature 102.4°.

*Operation* by Dr. Leonard St. John, three hours after admission, seventy-seven hours after swallowing capsule. After the usual preparations a crescentic incision with its convexity down and outwards was made over the reddened area. The subcutaneous tissue and all muscles of the abdominal wall were found densely infiltrated with serum, rendering them very firm. After cutting through the parietal peritoneum a tissue which was recognized as the omentum was found separating an underlying sausage-shaped firm tumor from the parietes. This was also incised, when a muddy, fetid pus escaped with a few bubbles of gas, showing the existence of a small abscess cavity surrounding a central somewhat cylindrical body, which was the appendix lying at the bottom of the abscess, soft, dull and greenish-white in appearance, its center showing a nodular enlargement about the size of a pea, which could be easily palpated. The appendix was then incised and an ordinary gelatine capsule of the two-grain size, containing a firm blackish substance, removed. It broke transversely at its middle and showed evidences of beginning solution. The wound was irrigated with hot sterilized water, packed with iodoform guaze, and a copious absorbent antiseptic dressing applied.

He was in excellent condition when put to bed. Five hours after operation his temperature was 101.4°, pulse 102. During the following day the foreign body which had been removed was shown to the patient, and he recognized the capsule which he had swallowed upon the preceding Friday evening. The further progress of the case is uninteresting. The wound was dressed every second day. Yellowish pus continued to be discharged for some time. The wound was



gradually closed up by granulations from the bottom, and the patient was discharged fully recovered on September 9th, having gained almost forty pounds since the operation, seven weeks previously.

**Case IX. Acute Appendicitis, with Tumor.** J. K., laborer, æt. 30. Appendicitis. Periappendicular Abscess. Operation. Resection of Appendix. Recovery.

Patient was admitted May 19, 1891, with a negative history as regards previous illnesses. He had enjoyed excellent general health until five weeks before admission, when he began to have pain of a sharp, lancinating character in his right side, extending from the region of the pubis to the spine, and also pain of a colicky nature referred to the umbilicus. He was constipated at the time, but did not vomit, had no appetite and was obliged to lie down at home.

*Upon admission* his temperature was 100° F. Pulse not recorded. Examination revealed a distinct tumor in the right iliac region, hard, situated at the outer end of Poupart's ligament, not painful to palpation. Its anterior boundary was well defined, the posterior only poorly. The mass was flat on percussion, and extended from the point mentioned to within one inch of the lower margin of the liver, where there was again tympanitic resonance. The tumor seemed to be firm and fixed, so that sarcoma or osteoma were thought of. About one week after admission the patient was prepared for operation, which was performed by Dr. Murphy, an incision being made three inches long over the tumor half way between the umbilicus and the right iliac spine. After the parietal peritoneum had been incised a large quantity of pus with fæculent odor escaped. This abscess cavity was irrigated and search made for the appendix, which was found lying free in the cavity, the walls of which were formed by the cæcum, parietal peritoneum and agglutinated coils of intestine. The appendix was drawn up into the wound and showed a perforation with ragged edges near its distal end. It was ligated as low down as possible and removed. The cavity was then thoroughly and carefully irrigated with hot sterilized water and a large rubber drainage tube inserted. No further notes are made on the history until August 6, 1891, when there was a granulating superficial wound at site of operation. He had been

working about the ward at this time for three weeks, and was discharged on August 7, 1891, fully recovered.

**Case X. Acute Appendicitis, with Tumor.** John W., æt. 25, plumber. Appendicitis. Periappendicular Abscess. Operation. Recovery.

Patient was admitted to medical side on August 21, 1891, and was transferred to the service of Dr. Fenger upon the next day.

He gave the following history: With the exception of what he termed "bilious attacks" he had always enjoyed excellent health up to four weeks before admission, when he had another of his so-called bilious attacks, during which he vomited, had no appetite and was very constipated. He took a cathartic, which relieved his condition until ten days before coming to the hospital, when he suddenly felt pain of a cutting, griping character in the right iliac region, which continued for five days, after which he seemed better, but was obliged to remain in bed, the pain existing in a moderate degree, accompanied by constipation, anorexia, nausea, fever ( $103^{\circ}$ ) slight frontal headache and enlarged spleen. He was admitted as a case of typhoid fever, and it was only after a careful examination that a correct diagnosis was made and the patient transferred to the surgical side. Examination here revealed the presence of an area immediately above and to the median side of the right anterior superior spine, which was tympanitic on percussion, but showing marked increase of resistance and extreme tenderness on even light palpation; the sense of resistance was evidently due to some deeply situated induration in the right iliac fossa, which did not pulsate and was not affected by respiration. There were no cutaneous changes. Operation was performed after careful preparation, an oblique incision three inches long being made, and all tissues of the abdominal wall and peritoneum divided, over the swelling itself. The cæcum was exposed at the upper angle of the wound, the omentum was seen adherent to a tumor at the lower angle, thus walling off the general peritoneal cavity from the wound. Three sutures were inserted into the parietal peritoneum of the edge of the wound nearest the median line, and this united to the cæcum, thus more effectually aiding in the isolation of the abscess cavity. The

tumor itself, lying just below and to the right of the cæcum, was then incised and bubbles of  $H_2S$  gas and fæculent pus escaped in large quantities. The abscess cavity was carefully irrigated with warm sterilized water and packed with iodoform gauze. The condition of the appendix itself could not be ascertained. The wound was dressed every second and later every fourth day, and healed from the bottom by granulation. The temperature only once rose to  $101^{\circ}$ . He was given liquid diet (milk every two hours) and salts p. r. n. He was discharged October 13, 1891, a small amount of pus still discharging from the wound.

## A CASE OF MELANO-SARCOMA OF THE LOWER JAW IN AN INFANT.

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OF NEW YORK.

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A BABY of three months was brought to me by its mother for opinion regarding a swelling in the mouth. This tumefaction was at about the middle of the left side of the gum of the lower jaw. It was approximately the size of a small almond, oval, of moderately firm consistency and covered by mucous membrane which was apparently normal. It did not seem particularly tender. The mother had noticed it but a few days previously.



FIG. 1.—Showing the tongue pushed to the opposite side by the tumor.

A fairly deep incision one-half inch long was made in it, but no pus was found. The cut surface seemed to present the ordinary appearance of inflammatory tissue. A simple mouth-wash was prescribed and the mother told to return with the baby in a few days. She did not reappear, however, until the expiration of a month. At that time the swelling had increased to an

enormous extent. It projected well beyond the middle line of the mouth, pushing the tongue far to the opposite side. It was about the size and shape of a duck's egg, its surface of a blackish red. It was dense, firmly attached to the body of the jaw, which, felt externally, was much enlarged and resistant. (See Fig. 1.) A small section was removed and examined microscopically. It showed the typical structure of a melano sarcoma, containing a large amount of pigment.

The condition was explained to the parents. They desired the chance offered by operative procedure, and Dr. W. T. Bull, who kindly saw the case in consultation, agreeing as to its justi-



FIG. II.—Showing the relation in size between tumor and the bone. *a*, condyle. *b*, sawn surface near symphysis.

fiability, the left half of the jaw was removed, under chloroform, at the New York Cancer Hospital in September, 1891. The ordinary incision along the lower border of the bone was used, the body divided a little to the right of the symphysis and the condyle dissected from the glenoid cavity. There was but very little hemorrhage with the exception of that from the internal maxillary artery; this was rather troublesome.

The time occupied in the operation was a little over an hour. The patient took the anæsthetic badly, failed to rally and died two hours after being returned to the ward.

The pathological report<sup>1</sup> is as follows :

The tumor is the size of a large egg, section through its middle measuring 4.7 c.m. in one direction and 3.5 c.m. in the other. It extends from a point just outside the symphysis anteriorly, very nearly to the coronoid process posteriorly. It embraces the body of the jaw excepting at its lower border. It is covered by a thin, fibrous capsule, with the exception of an area about the size of a cent, internally, where it projects into the mouth.

Its cut section shows a blackish centre with a firm whitish periphery. It seems to spring from the periosteum of the lower jaw.

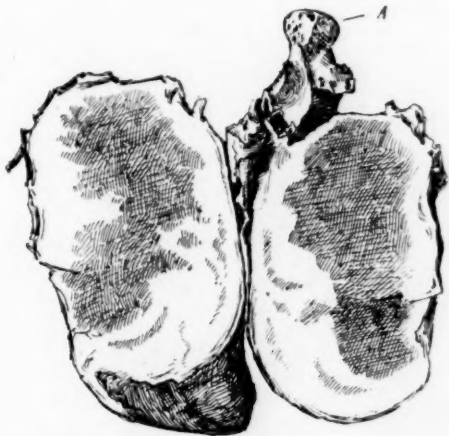


FIG. III.—Cut surface of the tumor. The melanotic portion is shaded. *a*, condyle.

Microscopically it is a melano sarcoma. The relation which the tumor bears to the jaw is shown in Fig. II. In Fig. III. the cut surface is represented.

I am conscious of having occupied far too much time in the extirpation of this tumor. Instead of carefully sawing through the body near the symphysis this might well have been hastily cut

<sup>1</sup> Examination made by Dr. G. C. Freeborn, pathologist to the Hospital.



across with forceps, and the same instrument would very quickly have divided the ramus. Considerable time was spent in isolating the lingual nerve. In a word, I feel that the portion of jaw which was the seat of the tumor should have been removed with adjacent tissues in the shortest possible space of time.

I find no record of similar operation on a child of this age.

## EDITORIAL ARTICLES.

### ARND ON THE METHODS AND RESULTS OF EXCISION OF RECTAL CARCINOMA.<sup>1</sup>

In an extensive, thorough and clear work. A. compares the various methods which have been employed in dealing with rectal cancer, details at length the histories of 35 cases operated upon by Kocher, and analyzes 230 additional operations, which he gathers from literature.

The communication is of such interest that it deserves careful study. It is of such length, however, that but few of its features can be noted here. Of interest is it to know that so long ago as 1874, Kocher published an account of an operation devised by himself for removal of cancerous rectum, which consisted in a posterior incision with excision of the coccyx. This he called the "Long posterior incision," and he ascribed to it the advantages which render the now popular operation of Kraske so useful, viz: Extirpation of the cancer is done with greater ease, certainty and completeness than by the older operations from below, and the bleeding is much more easily controlled.

So we must see that the Kraske operation brings to that of Kocher extension of the principle of posterior incision, and consequent ability to remove tumors which have a very high seat.

A. ascribes all credit to Kraske's procedure. He emphasizes with vigor, however, that in the great majority of cases of cancer of the rectum the long incision of Kocher will suffice. Of the modification made by Hochenegg, Henzfeld, Heineke and Levy it is not necessary to speak in detail, the principle is that of Kocher, extended and emphasised by Kraske.

Of the entire number of cases the peritoneum was wounded in 69, and of these only 9 (13 per cent.), died from peritonitis.

<sup>1</sup>C. Arnd (Berne.) *Deutsche Zeitschrift für Chirurgie*, Bd. xxxii, Hft., 1 and 2.

Without doubt these wounds should be closed by suture, and at the earliest possible moment. Kraske reports several accidents which followed this open treatment. In three of his cases the circular intestinal suture gave way, the proximal end of the intestine slipped back into the peritoneal cavity, and faecal infection occasioned a fatal peritonitis.

In nine of Kocher's cases was the peritoneum opened, and death occurred in each of the cases in which its suture was omitted. One died from suppurative peritonitis, one from delirium tremens with sepsis, and one from collapse. Only under exceptional conditions, then, should the surgeon resort to a peritoneal tamponade.

In dealing with the hemorrhage, which is always found in this vascular region, much depends on the rapidity and certainty with which the operator works. "Dry" dissection can be employed to a certain extent, but main reliance must be placed on the scissors and knife. When possible, vessels may be doubly ligated before division; yet rapid clamping and quick ligation will achieve completion with the least possible loss of blood.

In considering the question of intestinal suture one must always remember that failure will follow here more frequently than in regions where the faecal masses are less firm and the muscular contraction less active. Preliminary colotomy, commended by Schede and others, offers many advantages in diverting the faecal flow, securing quiet and freedom from distension.

The form of suture and its material will be governed by the individual preference of the operator, and will be adapted to the case under consideration.

As with all operations the mortality statistics are of little value. They differ with different operators, they vary with the various forms of operation adopted and with the seat and extent of the disease. It is worthy of mention, however, that a mean immediate mortality of 12.17 per cent. attends a total of 230 cases of rectum carcinoma subjected to radical procedure. Of the causes of death we call particular attention to but one, iodoform intoxication. Two fatalities are attributable to this out of Kocher's thirty-five cases.

Moreover König and Krönlein have reported two fatal results directly attributable to this dangerous drug. "That should suffice," says Arnd, "to caution one against the too free use of this powder. Would it not be safer and better to avoid it altogether?" Stierlin's warning regarding personal idiosyncrasy in the matter of susceptibility to "iodoformism" does not seem to be heeded as it deserves.

A. cannot share the exceedingly optimistic views of Bardenheuer and Stierlin regarding the future mortality attendant upon these operations. He feels, however, that despite the widened employment of radical attempts the mortality will surely decrease, thanks to a more certain care in the matter of bleeding, depressing antiseptics and attention to after treatment. Concerning the chief point in all malignant conditions, recurrence, we have no very certain data to guide us. Of ninety-eight collective cases 24.5 per cent. are said to have achieved a radical healing.

Kocher's integral statistics, however, present better results, and of these the most favorable were those in which the posterior incision was employed. If we may be guided by Arnd's conclusions we may believe that the so-called Kraske operation—be it with or without excision of a part of the sacrum—offers the greatest security against recurrence; and in this connection we may call especial attention to the astonishing fact that of twelve of Kocher's patients who survived this procedure—out of a total of seventeen operations, all of the cases histologically confirmed—nine, or no less than seventy-five per cent., were said to have been radically cured and were alive, free from recurrence, when examined four to sixteen years after operation.

CHARLES A. POWERS.

#### LANDERER ON THE TREATMENT OF FRACTURES.

That in the treatment of recent, simple fractures constant efforts should be made toward devising means for reducing the length of time of treatment and returning the patient to his labor, functionally capable, on the earliest possible day, all must fully admit. When, then, a surgeon of Landerer's repute sets forth procedures which he

<sup>1</sup>Prof. H. Landerer, Leipzig. *Saml. Klin. Vorträge.* No. 19. 1891.

avers capable of accomplishing such advance he demands for such the most careful attention.

In the pamphlet under consideration L. lays down the broad proposition that early, permanent removal of confining dressings, together with passive or active motion, and systematic, intelligently applied massage, tend to such result.

Before considering in detail the various steps and proofs of this important allegation one may with pleasure note the author's disapproval of the employment of embrocations or ice in the early stage "They belong," says he "to a bygone age—they can have no beneficial effect; away with them! The surgeon's first duty is to make an immediate and absolute reduction and to at once apply a suitable, well-fitting apparatus which will maintain correct position." All surgeons will agree that only exceptional cases will be found in which this rule will not apply.

Turning for example, to a simple Potts fracture, we find that at the earliest possible moment after the receipt of the injury the limb is placed in a suitable position with adduction of the foot, and a moderately padded plaster splint is applied. Under this, pain, muscular contractions and other discomforts abate at the end of twenty-four to thirty-six hours.

On the fourth or fifth day the splint is removed, good position of fragments and foot assured, and another plaster dressing applied, this time rather more snugly. The patient is now allowed to go about on crutches. On the tenth or twelfth day the splint is "sprung off," and systematic massage, with cautiously made passive movements instituted. These are carried out twice daily. On the thirteenth day the patient is allowed to place foot to ground, first with the dressing, then without, still on crutches. If no contra-indications exist,—old age, constitutional anomalies, etc., which would tend to hinder the ossification of the callus, the patient may be allowed to go about with two canes on the fourteenth day, with one cane on the seventeenth or eighteenth day, and he may dispense with this at the beginning of the fourth week. "Here," says L., "the soft parts receive the same attention

as the bony, the ossification is hastened through the local hyperæmia, and œdema is removed."

In the case of a Colles' fracture, after immediate absolute reduction, short flexible splints are moulded to the limb. These do not confine the fingers, active motion in which is encouraged. They are curtailed on the fourth day, and entirely dispensed with on the eighth day, after which time the limb is simply subjected to massage. After fourteen days the patients are able to do light work. The author does not employ plaster of Paris in Colles' fractures, saying with right that he cannot be as certain of the maintenance of reduction when using it.

In fractures of the patella L. follows Tilanus and Von Wagner in relying chiefly on massage of the quadriceps, the fragments being drawn together by plasters and the limb resting in a simple splint. At the end of the third week or the beginning of the fourth the patients begin to walk, and are said to be functionally capable, in many cases, in the fourth or fifth week. The author justly deprecates the conventional employment of any form of suture. Fractures of the neck of the femur or of the upper part of the humerus are treated in the same way, passive motion being commenced at a later date in the impacted than in the non-impacted cases. So, as well, with fractures of the leg; these are subjected to massage at the end of the third week, while one week later the patients are allowed to begin to walk. As a matter of course other plans are adopted when the lesions are very oblique.

Fractures of the thigh are treated in the usual way with extension apparatus, massage being begun in the fourth week. In the fifth or sixth week the dressings are discarded, the patient keeping his bed a week or two longer.

When the author commends the employment of very early passive motion in such lesions as the multiple fractures at the lower end of the humerus we cannot feel that he will command the support of American surgeons, who are now, as a rule, very fully in favor of the principle of rest. We may easily believe him, however, when he says that massage is of much value in cases of delayed union. It is to be regretted that we are denied access to the histories of L.'s cases



or to the only satisfactory testimony, viz., final results, with elapsed time and individual details. His clearly stated propositions, are however, of much interest, and the publication will repay careful study.

CHARLES A. POWERS.

LUCAS-CHAMPIONIERRE ON THE RADICAL CURE OF NON-STRANGULATED HERNIA IN WOMEN.

In a paper read before the Congress for the Advancement of Science at Marseilles, September, 1891, Dr. Lucas-Championierre stated that out of two hundred and fifty-five cases operated upon for the radical cure of hernia thirty-nine were women. Of these eleven had umbilical, seventeen inguinal and eleven crural hernia; all gave satisfactory results.

• The application of a truss in women is of little use, and even in umbilical hernias eighteen out of twenty are valueless even when they are comfortable to the patient. In young subjects, where a cure has apparently resulted from the application of a truss, the first pregnancy often causes a relapse. The immediate dangers from hernia are chiefly those attributable to pregnancy and child-birth. Although strangulation seldom occurs at this time, the hernia is usually increased. The secondary dangers are more formidable. The hernia is likely to be painful, irreducible and progressive. The organic changes in women are greater, more rapid and more serious than in men.

Operation should always be undertaken while the patients are still young, although very good results have been obtained after the menopause. Delays only expose the patient to useless dangers and lessen the value of the undertaking. The occupations of women are favorable to the continuance of the cure, and pregnancy following laparotomy has been proven not to be a serious complication.

Operation should not be undertaken during the menstrual period. Complete baths before the operation are not essential to success, and as they increase the liability to cold they are not advocated.

Umbilical hernia is rare among infants and young girls, but appears among young women at the time of childbirth, and increases the fatality of this period. It is almost impossible to keep it reduced,

it causes constant suffering from the omental adhesions, and renders the woman incapable of much exercise, so that she becomes obese, and her general condition changes as much as the local state. Diabetes is exceedingly common, and strangulation is a constant menace. The essentials to a complete cure are, first, the destruction of the whole sac; second, the complete reduction or ablation of the parts involved; third, the careful and firm reunion of the peritoneum and abdominal walls. The incision should be vertical, but may vary with the form of the hernia. In opening the hernial sac care must be taken not to open the intestine, which is liable to occur in consequence of the thinness of the membrane and the firm adhesions. The removal of the omentum is sometimes difficult, but by proceeding slowly and tying it off in small portions no mistake need be made. Sometimes it is necessary to pass a ligature about that portion of the omentum not directly involved in the hernia, and enough should be removed to prevent a recurrence. The dissection of the sac from the outer walls is easy, but in the neighborhood of the ring care must be taken not to enter the peritoneal cavity. The walls of the sac should be united by two crossed or by a continuous catgut suture. The margins of the wound are then closed by catgut, and sometimes a second and occasionally a third row of sutures are employed. Considerable redundant skin may be removed at times. Drainage should be employed. After the operation a belt with a small plush cushion should be worn. Ten of the cases in this class were true umbilical hernia, and one was epigastric.

Inguinal hernias in women are usually small, but painful. Some of those operated upon, however, were very large, one reaching to the knee. These hernias are considered congenital. In all cases the round ligament plays an important role. In some the ovary and Fallopian tube are more or less involved, and this proves the congenital origin of the trouble. In nearly all cases the round ligament forms a part of the sac, for at this point the membrane is so thin that it is impossible to detach it. It is readily understood, therefore, why this hernia, having such close relations with the internal genital organs, is the seat of sharp and often continuous pain, which in itself would be

an indication for operation. If the ovaries are diseased or adherent they should be removed, and the round ligament should always be cut off. Thus we are certain of the removal of one cause of the pain and of a more favorable condition for a radical cure than could be obtained by any other operation. There is no opening left in the abdominal wall, and the canal can be completely closed by sutures. The resection of the round ligament has no drawbacks, and leaves no troublesome results. These patients have been seen or heard from occasionally, and the results continue satisfactory. In the younger cases it is impossible to find any traces of the hernia except the cicatrix, and the pain has disappeared in all. One of the cases, a woman of fifty years, two months after her operation was killed accidentally, and at the autopsy the canal and the hernial cul-de-sac were found to have completely disappeared.

Crural hernia among women is also usually painful, especially when it is composed of omentum with close adhesions. In operating two distinct portions of the hernia are recognized, that which is in front of the cribriform fascia and that which is behind it. If only that portion in front is operated upon the result will be unsatisfactory. The fibrous ring must be freely split up and the dissection carried well beyond it in order to dispose of the cul-de-sac, which otherwise will threaten a recurrence of the hernia. It is also necessary in order to break up the adhesions that usually extend well beyond the ring; unless this is done there is no diminution of the pain. The completion of this operation is sometimes difficult and dangerous unless sufficient care is exercised in consequence of the proximity of the large vessels of the thigh. The neck of the sac should be carefully closed by crossed catgut sutures and the hernial canal by deep sutures. The results are very satisfactory, the pain disappears and there is little danger of a relapse.

SAMUEL LLOYD.

#### KORTE ON THE SURGERY OF THE GALL-PASSAGES AND THE LIVER.<sup>1</sup>

This is a study and review of the subject, based on twenty-two new cases. These he divides into five classes—affections of the gall-pas-

<sup>1</sup>W. Korte, *Saml. klin. Vorträge*, 1892, No. 40.

sages, liver abscess, subphrenic abscess, echinococci of the liver, and hepatic injuries.

1. Affections of the gall-passages. Here the formation of gall-stones is the most frequent indication for surgical interference. Not the gall-stone formation of itself, but its sequelae call, when internal remedies fail, for operative treatment. Here medicine and surgery do not compete but complement each other.

The indications for operation he formulates as follows :

(1.) Very frequently recurring gallstone colics which do not yield to internal means. This indication is relative, the individual conditions having to be considered.

(2.) Lasting retention-tumors of the gall-bladder that remain after the attacks. Here the existence of a large concretion is to be presumed, capable of producing evil consequences. As the onset of such results cannot be foreseen, our help by delaying may be too late, and even simple retention tumors cause trouble, especially to those engaged in manual labor. He holds that in these cases operative interference is as a rule indicated. Naturally one would wait where such swellings cause no symptoms and no inconvenience to the patient. Permission also would hardly be granted.

(3.) If after the colics have subsided the gall-bladder remains sensitive and enlarged an inflammatory process in and about the bladder is to be assumed, depending presumably on the presence of concretions and commencing ulcerations ; hence, after unsuccessful internal treatment an operation is indicated.

(4.) Where fever, pain and swelling point to a suppurative process, the operation should not be delayed.

(5.) Symptoms of closure of the bile duct, if internal medication fails, demand the operation.

Clinical experience is necessary for correct diagnosis, and various differential points are considered.

He has operated in twelve cases of cholelithiasis—eleven females and one male, although two other males withdrew without operation. All the women had borne children. In three cases the choledochic duct was blocked by calculi, in others there was dropsy or empyema

of the gall-bladder. Three of these cases died, though neither as a result of the operation. The others, in part after repeated operations, were discharged with normally acting biliary apparatus.

Cholecystotomy was performed seven times, once for dropsy of the gall-bladder from stone, four for empyema of the organ, twice for closure of the choledochus as a preliminary operation for cholæmia—only the last two at two sittings. Operation in two acts—separated by some days for the formation of adhesions—he would limit to the less frequent cases where the bladder-wall is so shrunken or so friable that it cannot be securely sewed to the opening. Three of these patients died. In two the gall-fistula was closed later, in one this occurred spontaneously, and in one it was immediately closed after construction of a vesico-intestinal communication.

Cholecystotomy he holds to be the most suitable procedure in empyema of the organ, in disease of its wall, and further in choledochic closure to avoid cholæmia by securing a necessary exit for the bile.

Where there is simply a formation of stone without disease of the wall, but with permeability of the choledochus, he prefers incision of the viscus, discharge of its contents and subsequent suturing of the bladder incision—so-called “ideal cholecystomy.” This was done five times. He prefers the transverse incisions parallel to the costal border. With the finger in the abdomen he then palpates the bladder and its discharge duct and frees interfering adhesions. The bladder is then drawn well out and plugged around by prepared gauze. Aspiratory puncture shows the nature of the contents; if not purulent the bladder is then incised, the patient lying over towards the right side. Contained concrements are generally floated out easily or withdrawn with the scoop. Stones in the duct (cystic) may be more difficult to remove. In one case he had to pass his fingers into the abdomen and press the stone out from beneath. The opportunity to do this is one advantage of this method. He has never succeeded in passing a probe through the cystic duct into the choledochic, although attempted in each case. Hence, as permeability of the latter is a necessary condition for this operation, this must be established by previous examina-

tion of the bowel passages and by palpation of the duct at the operation. After emptying the bladder it is washed out with some mild fluid like boro-salicylic solution and then sewed up with a double row of sutures—one for its own wall and one for the overlying peritoneum. The omentum can be advantageously drawn over the line of suture and fastened by one or two sutures. K. no longer in such cases attaches the bladder to the external peritoneal wound. The wound of the gall-bladder healed promptly four times and once caused a temporary fistula.

Extirpations of the gall-bladder he has not practiced, and cites reasons in opposition to the procedure unless the structure is the seat of malignant disease.

The severest biliary troubles come from closure of the common duct. When this is caused by strictures or tumors, or where the duct cannot be sufficiently exposed, then cholecystenterostomy is the proper operation. In two attempted cases this could not be accomplished, but in a third it was successful—even for the patient. Here he chose the duodenum (cholecystoduodenostomy) as was once previously done by Terrier.

2. Liver abscesses. In Germany this is most frequently caused by biliary calculi. One of K.'s two operated cases was of this origin, the other from perityphlitis—the latter cured. The bacterium coli commune was found in two cases of hepatic abscess and once in the gall-bladder.

3. Subphrenic abscess. 7 cases; 5 after perityphlitis, 1 from gall-stones, once following an old pyelonephritis. In 1 case he opened from the back below the 12th rib, following along the diaphragm until the pus was reached; in 3 he took the other admissible way, resecting a rib in the axillary line and usually the eighth, then going through the pleura and opening at the apex of the diaphragm. Of these 7 cases 6 recovered, the fatal one, however, being cured so far as this abscess was concerned, but dying of primary nephritis and erysipelas.



4. Liver-echinococci, 3 cases, all operated at single sittings; 2 recoveries,—1 death four weeks after operating.

5. Injuries to the liver, 4 cases. Two shot-wounds recovered after laparotomy—in the one case permitting ligation of bleeding vessels in the liver and adjacent bands. The other two cases were fatal from complications.

WILLIAM BROWNING.

## INDEX OF SURGICAL PROGRESS.

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### GENERAL SURGERY.

#### I. The Cure of Anthrax by Excision of the Pustule.

By T. PAGAN LOWE, M. R. C. S. (Bath, England). The author's experience is limited to two cases: (1) A man, aged 38, on the seventh day of the disease, presented on the right of the neck, about the middle of the posterior triangle, a large malignant pustule, consisting of a central dark-brown eschar surrounded by a zone of flattened vesicles, outside of which was an inflammatory zone, the whole of the right side of the neck being enormously swollen and oedematous. The treatment adopted was excision of the pustule in an elliptical mass, including the entire area of vesiculation, together with a considerable portion of healthy skin on each side and the deep tissues beneath, so as to insure complete eradication. The wound was freely irrigated with hot perchloride solution and well dusted with iodoform before its margins were brought together by sutures.

(2) The wife of the first patient, aged 40, who had assisted in dressing her husband's wound, was attacked two weeks later, the pustule developing on the cheek. On the fourth day the pustule was excised and its base freely cauterized, after which rapid convalescence ensued.

In both cases the disease was inoculated by the finger nail, the husband having scratched his neck after washing some buffalo hide, and the wife her cheek after dressing his wound.

The author remarks that the bacilli of anthrax are known to have a marked preference for the superficial layers of the dermis, slowly penetrating into the deeper parts; and these cases suggest that when anthrax attacks the skin it may remain local for a considerable length of time and produce a mild affection as compared with the same disease when attacking internal organs.—*London Lancet*, Jan. 23, 1892.

JAMES E. PILCHER (U. S. Army).

**II. On Facial Paralysis in Tetanus Hydrophobicus.** By DR. PAUL KLEMM, of Dorpat. Since Rose, in 1870, pictured the special phenomena of tetanus following cranial wounds—to which he gave the name “Tetanus hydrophobicus,” or “Head tetanus”—a considerable number of cases have been reported and carefully studied. In the work before us Klemm groups these cases, analyzing them and differentiating two forms: 1. Those in which tetanus follows a wound in the region supplied by the cranial nerves, the muscles in the immediate vicinity of the wound being first involved and the process gradually spreading thence, and 2. Cases in which plain evidences of facial paralysis are present in addition to the tetanic contractions of the facial muscles.

Ætiologically Klemm believes the paralysis to be a toxic one. Brieger has shown that the tetanus virus is composed of a number of alkaloids possessing different properties. The tetanotoxin has paralyzing characteristics. According, then, to the prevalence of one or other of the alkaloids, the facial paralysis may be of high grade, of low intensity, or quite absent.

So, in the 20 cases cited by Klemm, in the most intensive the paralysis was complete, in others only those branches in the vicinity of the wound were affected, while in still others the disease took the form of ordinary tetanus without evident paralysis of any of the muscles supplied by the facial.

In this connection we may state that the statistics of the civil war in America show 21 cases in which tetanus followed wounds of the head, and in none of these was paralysis of the nervus facialis observed.

Deutsche Zeitsch. für Chis. Bd. 32, I. 283

CHARLES A. POWERS (New York.)

#### HEAD AND NECK.

**I. A new method of Intracranial Neurectomy of the Second and Third Divisions of the Fifth Nerve.** By F. HARTLEY, M. D. (New York). In the case of a male, aged 46 years, who suffered from intractable neuralgia of the second and third branches of the left trifacial nerve, for which by previous operations

only temporary relief had been obtained, Dr. Hartley devised and performed the following operation for division of the affected branches within the cranium :—

The operation intended was to attack the nerve on the inner surface of the skull outside the dura mater, to isolate the second and third branches completely, to divide and resect as long a portion as possible. The advantages thought to exist in this method over Pancoast's or its modifications by Krönlein, Credé, and Salzer, or Lüke's operation, were the easy access to the nerve, the comparatively large field for work, the rapidity with which the operation could be done, and the small amount of hemorrhage. The disadvantage was the inability to resect as long a piece as could be done in some of the other methods. This disadvantage can be overcome in the future when the knowledge of the degree of adhesion of the fifth nerve and dura mater is better appreciated. It is not difficult to go beyond the Gasserian ganglion.

An omega-shaped incision was made, having its base at the zygoma and measuring a distance marked by a line drawn from the external angular process of the frontal bone to the tragus of the ear.

The curved and rounded portion of this incision reached as high as the supratemporal ridge, the diameter of said circle being three inches. The skin and deeper tissues were cut in the shape of the Greek capital letter omega. This incision was carried down to the periosteum of the skull in all portions of the incision, except in the straight part at the base; the tissues were then retracted and the periosteum divided upon the bone in the same direction and as far as the straight part at the base.

With a chisel a groove was cut in the bone corresponding to the divided periosteum. This groove went to the vitreous plate, except at the upper angle over the rounded portion where it included the vitreous plate.

A periosteum elevator was here inserted and used as a lever to snap the bone on a line between the ends of the circular portion of the incision. In this way the breakage occurs along the lower portion of the wound, and a flap, consisting of skin, muscle, periosteum, and

bone is thrown down, exposing the dura mater over a circular area of three inches in diameter. The middle meningeal artery was then tied, the dura mater was then separated from the bone, and the floor of the middle fossa of the skull was exposed. Broad retractors were used to raise the dura mater with the brain and to expose the foramen rotundum and the foramen ovale. The hemorrhage was stopped by sponge pressure. The exposure of the first, second, and third divisions of the fifth nerve, together with the carotid artery and cavernous sinus, was exceedingly good.

The second and third divisions were isolated at the foramen rotundum and the foramen ovale, and, by slight pressure upon the dura mater, it could be stripped from the nerves to beyond the Gasserian ganglion. These are divided with a tenotome at the foramen rotundum and the foramen ovale, and that part between these and a point beyond the Gasserian ganglion was excised. As this amount of nerve is not very great, the ends of the nerves were pushed through the two foramina so as, if possible, to interfere with any reunion. In the retraction of the dura mater, owing to imperfect instruments, the third, fourth, and sixth nerves were somewhat injured. As no bleeding was present, the brain was allowed to fill the fossa. The flap—consisting of bone, periosteum, muscle, and skin—was replaced. The irregular edge of the vitreous plate which remained attached to the bone not involved in the flap acted as a shelf on which the flap rested and prevented its falling in upon the dura mater. The periosteum was stitched, the muscle sutured in place, and the skin sewn with silk. One drainage tube was inserted at the lower angle; an antiseptic dressing was applied. Time of operation, one hour and forty minutes; the patient was carried to the ward in good condition. Following the operation, August 16th, ptosis of the left upper lid appeared, together with double vision and inability to move the eye.

At the end of six weeks the patient recovered from his paresis in the third nerve; the double vision, ptosis, and inability to use the third nerve have entirely disappeared. The paralysis of the pterygoids, temporal, and masseter muscles produced by the division of the motor portion of the fifth seems to have incommoded him to a very

slight extent. The false teeth worn in the lower jaw before the operation fit quite accurately their opponents in the upper. Protraction and retraction of the lower jaw seem to be diminished, but elevation and depression of the lower jaw seem good. As the patient has chewed since 1882 all his food on the side opposite to the present paralysis, he has not been distressed by the division of the motor portion of the fifth.

At the end of six months the patient remains entirely free from pain and has gained much in weight.—*New York Medical Journal*, March 19, 1892.

**II. Œsophagotomy for Impacted Foreign Bodies.** By ARPAD G. GERSTER, M. D., (New York). If a foreign body becomes lodged in the œsophagus and cannot be displaced downward into the stomach or extracted without the employment of much force, it is imperative to perform external œsophagotomy at once. With the exception of cases in which a goitre or cervical tumor impedes the otherwise simple steps of the operation, the procedure as now practiced is comparatively safe, its rate of mortality for all cases, recent and old, good and bad, being computed by Fisher as twenty per cent. The conditions are parallel to those existing in strangulated hernia. *An early operation is safe; a late one dangerous and very often useless.* Delay extending over twenty-four hours is never justified, and if at the end of this period extraction by bloodless processes is not easy, the gullet ought to be cut at once.

Tedious and often-repeated attempts at dislodgment in a case where impaction has been present for more than twenty-four hours are apt to be more dangerous than œsophagotomy. The patient's general condition is usually bad from fever and starvation, and the depressing effects of the manipulations in the fauces and œsophagus, productive of nausea and vomiting, are not to be slighted. Finally, the further injuring of the mucous membrane in the presence of septic ulcerative processes or sloughing, and the probability of causing *traumatic* perforation, are to be well weighed.

As regards the technique of œsophagotomy, the following points have to be observed: The incision should be ample, to permit com-



fortable operating without the employment of much traction and bruising of the organs exposed. Blunt methods of division are to be shunned, as torn tissues are not so viable as cut ones, and are apt to succumb very easily to septic influences that may proceed from an ulcerating or sloughing œsophagus. The incision should be just in front of and parallel with the anterior border of the left sterno-mastoid muscle, beginning a little below the level of the cricoid cartilage and extending to the sternal insertion of the muscle. The omo-hyoid is drawn aside, and the lateral margin of the thyreoid gland is exposed to serve as a guide. The large vessels should remain undisturbed within their common sheath, and are to be drawn backward and aside, together with the sterno-mastoid. Dissection should proceed between two mouse-tooth forceps. Thus vessels crossing the tract of the incision can be recognized and secured before being cut. Should the sternal portion of the sterno-mastoid be in the way, it may be cut also. The recurrent nerve must not be injured. The œsophagus can be recognized by the longitudinal direction of its fibers, or, if this is difficult, by protrusion practiced with a metallic catheter or urethral sound from within. It is incised between two small, sharp retractors, and fillets of silk are passed through the edges of the cut, by which manipulations within the viscus are made much easier. In the absence of septic complications—and this may be fairly expected in cases receiving early attention—the edges of the œsophageal wound should be stitched at once with fine silk. The outer wound is to be packed loosely with iodoform gauze. A few silkworm-gut stitches may be inserted into the cutaneous edges of the wound, which however, is to be closed only after the removal of the packing. In these cases alimmentation by the mouth can be commenced at once with liquid substances, and the patient should swallow very small quantities and while lying on the right side. Minute leakage will often occur, but will not interfere with the rapid healing of the wound. In those cases where ulceration or sloughing has occurred, suture is often impracticable and rarely safe. The open method by packing is in order, and large defects may necessitate the use of the stomach-tube, which can be inserted through the wound or by the mouth or nares.—*New York Med. Jour.*, Feb. 6, 1892.

## ABDOMEN.

**I. Intestinal Anastomosis and Suturing.** By R. ABBE (New York). The author does not attach much importance to the use of any of the artificial aids recently devised to accelerate the operation. The accidents may occur of having leakage, or suppuration, or hemorrhage, or obstruction from plates, or irritation of the canal from so considerable a foreign body. The question of time gained during what is usually a prolonged operation, perhaps at most five or ten minutes, in the face of the uncertain advantage of bone plates, etc., is one that in his opinion is greatly outweighed by the superior advantage of having absolute security against leakage, blocking, etc., by the method of simple suturing, the technique of which is easier performed and gives better results than attend any of the new methods.

There is one feature of the operation of anastomosis which has heretofore received no special attention, but which he believes to be of the very greatest moment in determining the lasting benefit of the operation, that is, the question of stenosis of the newly made orifice. The law of cicatricial contraction, that operates so effectually in closing accidentally made fistulæ into the intestinal tract, or comparatively large ulcerations between the gall-bladder and the intestines, is here the direct antagonist of the surgeon in his endeavor to create a permanent and adequate anastomotic opening. The incised opening made for the use of Senn's plates is about one inch and a half in length, and the contraction of such an opening sometimes with great rapidity has in some cases rendered it entirely inadequate to its service. Not many autopsies remote from the date of operation are as yet recorded. Three of the author's cases of lateral anastomosis illustrate the subject admirably. In the first, done in 1888, between the ascending and transverse colon, Senn's plates were used. The patient dying six months after operation, the aperture, which was one inch and a half in length, had contracted to three-fourths of an inch, and was sufficient for its purpose only when laxative medicine was constantly given. In the second case, the patient dying six months after anastomosis, with catgut rings, the opening had con-

tracted from one inch and a half down to a half-inch. In the third case, eight months after lateral anastomosis of the sigmoid by suturing, the aperture contracted from three inches to one and a half. This was perfectly competent to do the functional work of the bowel.

These results were relatively good, but not so perfect as that which so far has been brilliantly demonstrated in two other cases where lateral anastomosis by suturing around a four-inch opening was done with instant and absolute functional restoration.

A. believes the future utility of lateral anastomosis lies in making openings four inches in length in the sides of adjacent bowel. This is almost impossible with bone plates, and only to be done by very long catgut rings or vegetable plates, with less security and as much consumption of time as by suturing. The contrast is enormous between dropping back into the abdominal cavity a beautifully sutured, absolutely tight and flexible anastomosed end of intestine to any position in the abdomen which its natural surroundings demand, and the returning a huge bunch of bowel, inside which there is a pair of five-inch plates of bone or raw potato, to remain as irritating foreign bodies stimulating peristalsis, and tugging at the wound until they are softened enough to be swept on by the current, or, as in one of Senn's cases, to be vomited up after dangerous retching.

As regards time, even were it proved that a hand equally expert at each method could do that by plates a few minutes quicker, the relative advantage of the two procedures for safety still lies with suturing.

A. strongly advocates in cases of great fecal accumulation the uniform practice of first creating an artificial anus and allowing the escape of the feces for some days before doing the anastomosis. He now believes that the perfect technique of suturing consists in the following method:

Bring the two surfaces that it is proposed to unite well up into the wound, and surround them by small compresses wrung out of hot water. Have at hand a half dozen fine cambric needles threaded with ordinary finest black silk that has been well boiled and kept in alcohol. Cut in lengths of not more than twenty-four inches, and

tie with a single knot at the eye of the needle, with one end cut to within two inches. Apply two parallel rows of continuous Lembert suture, a quarter of an inch apart, and an inch longer than the proposed cut. Leave each thread with its needle attached at the end of its row. Now open the bowel by scissors, cutting a quarter of an inch from the sutures, both rows of which are to remain on one side of the cut. Make the bowel opening four inches long. Apply clamps temporarily to several bleeding points, pinching the entire thickness of the cut edge without hesitation. Apply no ligatures. Treat the opposing bowel in the same manner. The clamps remaining *in situ*, the parts are quickly rinsed with water. Another silk suture is now started at one corner of the openings and unites by a quick overhand the two cut edges lying next the first rows of sutures. The needle pierces both mucous and serous coats, and thus secures the bleeding vessels, from which the clamps are removed as the needle reaches them. This suturing is then continued round each free edge in turn, and all bleeding points are thus secured more quickly than by ligature. The serous surfaces around these button-holes are then rapidly secured by a continuation of the sutures first applied, the same threads being used, the one nearest the cut edge first. The united parts are again rinsed with water and dropped into the abdomen.

His conclusions are summarized as follows: 1. That the attempt to simplify the technique of lateral anastomosis by bone plates and other devices has not improved it. 2. That lateral anastomosis properly done is eminently the safest and best method of restoring the canal in most cases. 3. That simple and thorough suturing with a fine silk continuous suture, applied after the manner detailed, is most satisfactory. 4. That in order to allow for the inevitable tendency to stenosis an aperture four inches long should be made between bowels. 5. That scarifying opposing surfaces is entirely unnecessary to quick and solid repair.—*Medical Record*, April 2, 1892.

**II. On resection of Intestine.** By Dr. P. SACHS (Berne).  
After a short glance at the history of the operation and a review of the

earlier cases S. reports *in extenso* thirty-five from the clinic of Prof. Kocher, with a mortality of 54.6 per cent.; twenty-five were resected no account of gangrenous hernia, with 60 per cent. mortality; in seven cases a preternatural anus of long standing occasioned operation, of which cases 42.8 per cent. were fatal. Seven of the first set presented Littre's hernia, and in these 71.4 per cent went on to healing.

In comparison with those cases of gangrenous hernia treated by resection may be placed seven cases in which Kocher made an artificial anus; but once with success, and with a consequent mortality of 85.7 per cent., as against 60 per cent. in the resections with immediate suture or with early secondary suture.

Cases which are to be subjected to the ideal procedure are to be carefully selected, avoiding those in collapse, those with peritonitis and those in which approximate perfection in technique is impossible. We cannot think the presentation of mortality lists regarding form of antisepsis, suture material, etc., of much value unless compiled from a large number of cases presenting similar conditions.—*Deutsche Zeitsch. für Chirurg.* 1891, Bd. 32, Heft. 1 and 2.

**III. A Case of Dermoid Tumor of the Navel.** By Dr. PAUL GUETERBOCK, of Berlin. While dermoid tumors of the superficial layers of the abdominal wall may occur at any portion of it, those penetrating deeply seem to have been observed only at the navel. Quite a parallel case to that of Duplay (cited by Longuet, *Traité élémentaire de pathologie externe*, vi. p. 818) is the following:

A 16-year old boy sought treatment for an abdominal swelling which he was said to have first noticed two weeks previously, it having considerably increased in size during the last week. The tumor was the size of a child's head, roundish, nodular at places, painless and movable. It occupied the mid-line between the ensiform cartilage and the navel, embracing the latter. Skin partly adherent, abdominal contents thought to be adherent also. During the next few days the tumor became inflamed, fever set in. Incision revealed a large irregular cavity having a membrane containing thin pus and masses of cheesy material. Thorough scraping, disinfection, healing.

Examination revealed the lower organized epidermoidal structures, cholesterin, fat crystals, epithelium, etc.—*Deutsche Zeitsch. für Chir. Bd. 32, Heft 3 and 4.*

**IV. A Report on 200 Herniotomies.** By Dr. RUDOLPH HABES, (of Magdeburg). A statistical paper detailing histories of the cases of herniotomy in Hagedorn's Clinic for the seven and one-half years ending with July, 1890. Of the entire number, 30 were non-incarcerated, 13 reducible, 17 irreducible—all of which recovered. The remaining 170 were incarcerated, of these 29—17 per cent. of the latter number—being fatal.

In all cases in which no contraindication existed an attempt at radical cure was made after the ordinary manner of Czevny, or this slightly modified. In general the wound was sutured, drains being omitted. In a few cases, however, tamponade was used, this with the intention of preventing collection of secretion.

Hagedorn seems to have been somewhat conservative in recommending operation in non-incarcerated cases, reserving it for those in which the hernia was of large size, painful, or in patients who had already suffered attacks of incarceration.

Childhood was not looked upon as a contra indication, the operation being carried out four times on children who presented very large herniæ. Of the 170 incarcerated cases, 66 were inguinal, 96 cruval, 1 obturator, 3 umbilical, and 4 ventral. Among the inguinal cases worthy of special note may be mentioned two in which the processus vermiformis was found to be adherent to the sac. Again, he noted among the femoral herniæ one case in which a diverticulum of the urinary bladder was found behind the sac, as well as one in which the right Fallopian tube formed part of the contents of the hernia.

Primary section of intestine and circular enterorrhaphy were adopted in sixteen cases, with nine deaths. Indications thereto was found in necrosis of such area that it could not be closed in by Lembert's suture. Continuous suture of the mucosa was followed by Lembert's suture of the serosâ, the latter also continuous. Catgut was used in all cases, quick absorption not being feared, since good union was to be expected at the end of twenty-four hours.



Although the individual histories of the cases narrated by Habs are of much interest, and will repay careful perusal, it is greatly to be regretted that the author omits mention of one of the most important points, viz., recurrence of the herniæ. This has been shown by Bull, of New York, to be very frequent after all forms of procedure, and the large number of cases reported by H.—169 recoveries—would, had they been carefully examined regarding ultimate results, have afforded valuable statistics.—*Deutsche Zeitsch. für Chir. Bd. 32 Heft 384, 1891.*

CHARLES A. POWERS (New York).

#### GENITO-URINARY ORGANS.

**I. Perineal Drainage in Inveterate Stricture of the Penile Part of the Urethra.** By C. MANSELL-MOULIN, F. R. C. S. (London). Observing that in other parts of the body, the absorption of the products of chronic inflammation begins as soon as the irritation that gave rise to it ceases to act, the author could see no reason why if strictures could be placed under the same conditions, the same result would not follow—at least in those cases in which there has been no destruction of the mucous membrane. That this was the fact was first observed in cases of extravasation of urine, where strictures of the urethra sometimes disappear spontaneously. In one case where retention had been followed by rupture and extravasation, and the patient's life was despaired of, perineal section was followed by relief to the general symptoms and improvement in general health, while, in the sixth week after, a number two English bougie passed through the urethra almost without effort, and daily catheterism for a week entirely removed what remained of the stricture. In such a case as this spasm and congestion might have had some influence, but the real change was in the dense gristly mass that surrounded the urethra and filled up all the interstices in and around the submucous tissue; left for six weeks in absolute quiet and without irritation, it had undergone a process of degeneration and absorption, so that the passage of the bougie readily unfolded and opened out the contracted portion of the urethra. The measure is a severe one, giving rise to considerable inconvenience for some length of time, although the author

remarks, if the patient will put up with it, he will be amply repaid in the future. It is more likely, however, to be reserved for extreme cases. —*London Lancet*, Jan. 16, 1892.

JAMES E. PILCHER (U. S. Army).

**II. Tuberculosis of the Urinary Bladder and the Value of Suprapubic Cystotomy in its Treatment.** By L. S. PILCHER (Brooklyn). The author details four cases of bladder tuberculosis in which suprapubic cystotomy was resorted to, with marked benefit in two of them, while in the other two no benefit resulted. In the case of a female the opening of the bladder above the pubes was a very satisfactory proceeding, as an aid to the exploration of the bladder and in the help which it gave in ascertaining its precise condition, but its after-care required prolonged confinement to the bed; and the discomforts attending the constant outflow of the urine above the pubes could only partially be overcome by the use of voluminous absorbent pads. The author doubts whether any benefit was derived from the efforts at topical medication that were made; and questions whether in any of these cases any substantial advantage is to be hoped for by attempts at special topical autitubercular treatment. The tubercular infiltration is not a superficial infection, to be arrested or diminished by the powderings, instillations, or irrigations that are available for use in the interior of the bladder. The curette and the cautery cannot be resorted to with any such degree of thoroughness as to encourage a hope that even a considerable portion of presumably infected tissue has been removed by them. The most that can be hoped for from treatment is to prevent the collection of urine in the bladder, to keep the bladder at rest, and to mollify the effects of the existing infection by relieving pain, removing *débris* and irritating secretions, preventing muscular spasm, and restraining inflammation. If this can be accomplished it may possibly be that in certain very favorable cases an indefinite arrest, even the entire recession of the tuberculosis, may take place.

The value of the suprapubic incision, therefore, does not consist so much in any opportunity which it may afford to give access to the disease itself, but rather in the superior degree in which it facilitates the accomplishment of these apparently secondary indications named.

In the male there can be no question as to the superiority of a suprapubic opening to a perineal one in carrying on the treatment of this special class of cases. In the female, however, the relations of the base of the bladder to the vagina are such as to suggest that by the formation of a generous vesico-vaginal opening an equally efficient and much more convenient outlet to the bladder would be furnished than could be had above the pubes. The author's experience in the case of the female in question would suggest to him that in a similar case again it would be better, after having made the exploration of the bladder by the suprapubic opening, to establish a free opening through its base into the vagina and then suture the suprapubic wound, relying on the vaginal outlet for the after-treatment of the case.

Perineal drainage was tried as an accessory in one man, but the pain and irritation caused by the presence of the tube in that location, its vesical end necessarily resting upon the ulcerated surface, made its withdrawal necessary after a very short time. Further experience and observation have satisfied the author that it can rarely be of any added advantage to have a perineal opening as long as the suprapubic opening remains patent and the contractility of the bladder walls has not been destroyed.

In conclusion, the author considers the two questions:

1. How early in a case of possible bladder tuberculosis is a suprapubicsection desirable.
2. How long is it desirable to maintain the suprapubic opening patent?

The answer to the first of these questions is to be found in a consideration of the indications which the operation may be accepted as subserving. It is by securing bladder rest and drainage that the operation is especially useful. The symptoms that demand attention are those usually of cystitis; if these symptoms do not readily yield to the well-known accepted constitutional and local measures, of treatment, recourse to cystotomy is indicated and should not be unduly deferred while the general strength is being sapped by the local suffering, the extension of disease, and the absorption of deleterious substances into the circulation.

The second question must also receive an indefinite answer. In the most favorably affected cases a gradual subsidence of the symptoms which had called for operation may take place; the ulcers cicatrize, the inflamed mucosa resumes its normal state, the urine becomes bland and healthy, or at least comparatively unirritating, and the bladder becomes again capable of acting as a reservoir for urine, and of painlessly expelling it at suitable intervals.

When this condition has been secured the suprapubic opening may be allowed to close, but a prolonged period of time, possibly many months, must be expected to be required to bring about this end.

In other cases it is to be expected that comparative comfort only will be enjoyed as long as the bladder is not called upon to retain the urine for any time, which will necessitate the indefinite retention of the suprapubic opening and a suitable permanent drainage apparatus.

In much the larger proportion of cases, however, and especially those in which the bladder disease is secondary to or associated with progressive renal or pulmonary tuberculosis, it must be that the fatal termination of the case will early dispose of any question that might have arisen as to the permanency of the suprapubic opening, which may have been made for the purpose of temporarily alleviating the suffering caused by the condition of the bladder.—*New York Medical Journal*, March 5, 1892.

#### ABCESSES—TUMORS.

**I. On a Case of Gas-Abscess.** By DR. E. LEVY (of Strasburg.) But few cases have been recorded in which a spontaneous development of gas has taken place in a simple abscess. Lavalée and Saxinger have described such events following puerperal pyæmia, Schreiber notes a liver abscess which contained gas, and Lübke cites one in which gas was found in a suppurative knee-joint. Further, the development of gas in peritoneal exudates has been described by Breslau and Dressler, and in cysts by the latter as well as by Cantani. Velpeau, in his "*Traité des Maladies du Sein*," 1858, believed this condition when found in mammary abscesses to be explained by the proximity of the lungs; Chassaignac, however, disputed this, think-

ing the phenomena due to decomposition of the milk, occasioned by contact with the secretion from the child's mouth.

Quite recently Arloing (*Progrès Médical*, 1887), investigating a gas-containing abscess of the orbit, found a specific, gas-forming bacillus which had some of the characteristics of the vibrio septicus.

This bacillus injected in small animals was found to be capable of causing the development of gases in the subcutaneous connective tissue.

In this connection a case described by Levy is of interest. A multipara had enjoyed good health until three days after her third confinement, at which time a considerable swelling developed in the right pelvis, extending to the hip. She was bedridden for five months, at the end of which period she came under L.'s care. At this time the upper third of the thigh was much swollen, the distension involving also the right iliac fossa. The hip-joint seemed free. Deep palpation revealed evidences of gas and the cavities above and below Poupart's ligament communicated. Percussion gave tympanitic resonance. A sterilized canula withdrew gas, which was caught under quicksilver.

Ordinary incision, prompt healing.

Bacteriological investigation showed, in addition to the ordinary treptococcus pyog., colonies of bacilli somewhat similar to those of anthrax. These latter consisted of short, fine, non-moving bacilli arranged in chains and threads, slightly colored with ordinary stains, not colored by Gram's method.

As they could not be procreated, researches on animals could not be carried out.—*Deutsche Zeitsch. Für Cir.*, Bd. 32, Heft 3 and 4, 1891.

CHARLES A. POWERS (New York.)

#### BONES.—JOINTS.—ORTHOPÆDIC.

**I. Bursal Exostosis and Its Origin.** By Dr. L. W. ORLOW (St. Petersburg). Viewed from a histogenetic standpoint, two forms of exostoses are observed, those growing from cartilage tissue and those which take their origin from a non-cartilaginous connective tissue, the latter arising from the periosteum or independently of it. While all parts

of the skeleton which contain cartilage tissue can serve as the starting point of the cartilaginous exostoses, they are most frequently found at the ends of the long bones. Cases in which they are found at some distance from epiphyseal cartilage are explained through the fact that they take their origin in an earlier developmental period of the bone, and synchronously with its growth come to lie at a greater or less distance from the epiphysis.

These cartilaginous exostoses are separated from the surrounding structures by a loose connective tissue, and are covered at their free extremities by a layer of cartilage of varying degrees of thickness. This may, however, become lost in the exostoses of long standing and of large size. They are generally single, but are at times met as multiple tumors, not infrequently symmetrical, on both sides of the skeleton. In addition to these solitary and multiple forms, a third has been described under the name of exostosis bursata. Its especial characteristic is a pouch which covers the free surface of the tumor and which in general resembles a synovial membrane. The inner surface of this pouch may be either smooth or shaggy, and its cavity is filled with a fluid resembling synovia. This fluid is sometimes present in so great quantity that it forms the chief symptom of the tumor, and it is only after opening it that one finds the small, solid mass at its bottom.

These basal exostoses are rarely met. O. is able to gather from literature only some nine authentic examples, to which he adds one seen by himself in Tiling's clinic. This latter occurred in a boy of fifteen years, who, when eleven years of age, accidentally observed a hard lump on his right thigh. This grew slowly, and when seen formed a roundish, hard, immovable tumor at the inner third of the right femur, about at the junction of the middle and lower thirds. On cutting through the vastus internus a whitish pouch was found immediately over the tumor, movable on it. On opening this sac a few drops of fluid resembling synovia flew out. In the bottom of the sac a bony tumor was seen, covered by a layer of cartilage and apparently fixed by a broad base to the surface of the femur. On chiselling it away, however, it was found that it was attached by a long and nar-



row bony pedicle to the upper surface of the internal condyle, and that a space of  $\frac{1}{2}$ –1 cm. separated it from the shaft of the bone. Removal, prompt healing.

Microscopically the tumor was found to consist of large cartilage cells grouped in a structureless basement substance. The sac was made up of connective tissue with elastic fibres. Neither the cartilage nor the inner layers of the sac were clothed with epithelium. *Deutsche Zeitschrift für Chirurgie.* Bd, 31. Heft 3–4.

CHARLES A. POWERS (New York).

**II. Indications for the discontinuance of the Mechanical Treatment of Hip-joint Disease.** By N. M. SHAFFER, M.D. (New York).—Prolonged treatment seems necessary in the majority of cases. Tubercular lesions of the joints are not easy to control, and repair takes place very slowly once the cartilage is gone and the bone is fairly attacked, or when there is a lesion at the epiphyseal line. Recognizing these points fully, we may state that if there is pain referable to the joint lesion, if manual concussion to the heel produces pain or flinching, if there is considerable deformity without ankylosis, if there is a true joint limp, or if there are abscesses or sinuses connected with the joint, we are not justified in discontinuing mechanical treatment. Or if there is reflex muscular spasm, limiting joint movement slightly in all directions; if there is almost perfect flexion of the joint, with the other movements considerably or markedly limited; if flexion and abduction and adduction are excellent, with rotation and extension limited; and, finally, if all the movements of the joint, except rotation inward during flexion, approximate the normal, there is almost a certainty that mechanical protection is necessary. Of course, it is understood that the limitation to motion above referred to is occasioned by the neuro-muscular protection peculiar to the disease. Not that it necessarily follows that an active tubercular process exists; but, if too much liberty is given the joint under the circumstances above named, ordinary use of the joint becomes a traumatism, and a relapse, especially as to deformity, is almost sure to occur. This relapse may occur in a few weeks or months, or may be in a few years.—*N. Y. Med. Journ.*, Nov. 29, 1891. 599.

**III. The removal of necrotic and carious bone with hydrochloric acid and pepsin.** By ROBERT T. MORRIS, M. D., (New York). Sometimes it is desirable to remove dead bone without subjecting a weak patient to a dangerous or deforming operation. Attempts have been made with some success at clearing out this bone by a process of decalcification, but there are two chief reasons why failures have resulted as a rule. In the first place, it was discovered that superficial layers of dead bone were decalcified easily enough, but the acids did not reach deeply through the mass, especially if portions were infiltrated with caseous or fatty *debris*. In the second place, cellulitis was pretty apt to develop during the course of treatment. After much experimentation I have finally adopted a method of work which seems to be complete. An opening is made through soft parts by the most direct route to the seat of dead bone, and if sinuses are present they are all led into the one large sinus if possible. The large direct sinus is kept open with antiseptic gauze and the wound allowed to remain quiet until granulations have formed.

Granulation tissue contains no lymphatics, and absorption of septic materials through it is so slow that we have a very good protection against cellulitis. The next step consists in injecting into the sinus a two- or three-per-cent. solution of hydrochloric acid in distilled water. If the patient is confined to bed the injections can be made at intervals of two hours during the day; but if it is best to keep the patient up and about the acid solution is thrown into the sinus only at bed-time. In either case the patient is to assume a position favorable for the retention of the fluid. Decalcification takes place rapidly in exposed layers of dead bone, and then comes the necessity for another and very important step in the process. At intervals of about two days an acidulated pepsin solution is thrown into the sinus (distilled water, f oz. iv; hydrochloric acid, oz. xvj; Fairchild's pepsin, oz. ss.), and this will digest out decalcified bone and caseous or fatty *debris* in about two hours, leaving clean dead bone exposed for a repetition of the procedure. The treatment is continued until the sinus closes from the bottom, showing that the dead bone is all out.

Even in distinctly tuberculous cases the sinuses will close if apparatus for immobilizing diseased parts and tonic constitutional treatment are employed, as they should be in conjunction with our efforts at removing the dead bone.

If suppuration is free in any cavity in which we are at work, it is well to make a routine practice of washing out the cavity with peroxide of hydrogen before each injection.—*New York Med. Jour.* March 19, 1892.

**IV. Ecchinococcus in the Knee-Joint.** By DR. GEORGE FISCHER, (Hanover.) In the cases hitherto reported in which the ecchinococci have been found in the joints, previous implication of bone has been demonstrated, the cocci having found their way to the joint from the bone. Especial interest attaches, then, to this case of F's, as no source outside of the knee could be discovered.

His patient was a man of forty-four years, who, while lifting a heavy chest, sustained its entire weight on the lower end of the thigh. He worked afterward, but on the third day noticed swelling and pain in the knee; this compelled him to cease labor on the tenth day, and on the eleventh day he entered the hospital. At this time the left knee was the seat of a fluctuating swelling, which extended above and internally. The circumference was six cm. larger than that of the fellow. The skin was not colored. After local applications for some days a small incision was made above and within the the patella, and a thin, nearly clear fluid let out, this fluid containing a number of masses of ecchinococcus hooklets. Sublimate irrigation, counter opening, drainage. Fourteen days later, the joint being still distended, long incisions were made on either side, the synovial membrane thoroughly scraped and partially excised. Further course satisfactory and unimportant.

It may be supposed that an ecchinococcus cyst had existed in the joint, or previously in one of the muscles, and that it had been broken at the time of the injury, allowing the hooklets to escape into the joint. The supposition cannot be verified, however, and the source must remain in doubt.—*Deutsche Zeitsch für Chir.* 1891, Bd. 32, Heft. 1 and 2.

CHARLES A. POWERS, (New York).

## REVIEWS OF BOOKS.

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TREATISE ON GYNÆCOLOGY, MEDICAL AND SURGICAL. By S. Pozzi, M. D., Surgeon to l'Hopital Lourcine-Pascal. Translated from the French, under the Supervision of and with Additions by BROOKS H. WELLS, M. D. Volume I., with 305 wood engravings and 6 full-page plates in color. New York, William Wood & Co., 1891.

The work before us is one adapted chiefly to the use of the specialist and one well up in surgical practices, and of but little use to the general practitioner doing gynæcological work. The arrangement of the subjects is good, and but little unnecessary repetition is noticed. It does not contain a large amount of new matter, but in most subjects is up to date. The time-honored chapter on anatomy and histology is wisely omitted. But little credit or mention is given to American authors. The bibliography is very full, but the index is not complete. The chapter on antiseptics is complete, and while the extreme measures advised by some are not advocated, nothing essential is omitted. Instead of rendering tents of one sort and another aseptic, we think it would be better to abandon their use entirely, which is, we think, rapidly becoming the custom.

Chloroform seems to be preferred as an anaesthetic, and the administration of morphine and atropia hypodermically, 15 to 20 minutes previously, is commended. But little mention is made of ether; we would be glad if writers and teachers would insist on the slow administration of this anaesthetic instead of the rapid, suffocating method in vogue. Under the head of "Methods of Suture and Hæmostasis" a very complete and intelligent description is given of ligatures, sutures, forceps, drainings of the abdomen by tubes of different patterns and gauze, thereby saving a good deal of repetition in the subsequent chapters. The author's method of continuous irrigation of the vagina and uterus is considered far inferior to that of Bozeman.

The translator states, under the heading of "Methods of Gynecological Examinations," that vaginal touch should only be practiced between two antiseptic injections; we would be glad to know if he practices this in either his dispensary or private practice. In the cases mentioned of death following simple vaginal examinations, we can but think there was something grievously wrong with either the examining finger or the method employed. It is impossible for us to understand the adherence of the author and European surgeons generally to the cylindrical and bi-valve specula.

The insistence of extreme care and gentleness in the use of the uterine sound is to be commended in the highest terms, especially when we think of its promiscuous use by the general practitioner.

We cannot indorse the use of the laminary tents, or any other material that closes up the cervical canal as it dilates. If rapid dilatation is not advisable or practical the same end can be accomplished as surely, and far more safely, by the use of iodoform gauze. The danger is not that the tents cannot be made sterile, but that they close up the canal as fast as they dilate, and so prevent all drainage.

The author places great stress on metritis, giving it as a disease itself much more prominence than most writers. The classification has the merit of simplicity, and is based on the clinical study of the disorder. We think it would have been better to have made a greater distinction between the lesions of the cervix and body, and it is our opinion that diseases of the body are more often a sequence of cervical conditions. Pozzi states that Emmet has certainly exaggerated the importance of laceration of the cervix, which he styles a slight accident. In his opinion we do not agree, and venture to state that the lack of importance given to it is due to unsatisfactory therapeutic results owing to the non-appreciation of Emmet's method of repair. If, as he implies, it is but of little account, how does he look upon the frequent development of malignant disease of the cervix after neglected lacerations, as is abundantly proved by Drs. Emmet and Byrne. But in a later paragraph he acknowledges that laceration may cause metritis. We would also like to ask how it is that the uterus will be reduced from one-half to one inch in length in a short time

after proper repair of the cervix if it really has so little influence on the corpus as the author indicates.

The three chapters on metritis might well have been combined, for there are many repetitions, and while the classification is simple, it is mixed in the text. Under the treatment of this subject cervical laceration is discussed. A flap amputation of the cervix is advised whenever with cervical laceration there is also cervical catarrh. Unless the discharge can be permanently removed at the time of operation we would consider this a dangerous practice.

Schroder's operation of excision of the diseased mucous membrane, the author states, is preferable to Emmet's operation, as it restores the external os; that it restores the external os is undoubtedly true, but is this to be desired, thereby leaving the torn cervical tissues ununited within, making a pocket for the collection of discharges?

No disciple of Emmet would recognize his operation from the published cut, and we can easily understand why the statement is made that it has no advantage if done that way. Pozzi's chief reliance in combating metritis is the curette and intra-uterine medication. The plate illustrating lacerations, ulcerations and erosions of the cervix is excellent.

The views of different pathologists as to uterine fibromata are given, but little is said of the etiology, and no especial support is given to any of the advanced theories. The subject is considered thoroughly, and a fair consideration given to the different methods of treatment in carefully selected cases. A good deal of value is credited to the purely medicinal treatment. Electricity is considered fairly on its merits, and while the advantage claimed by some practitioners is not acknowledged, it is credited with good results in suitable cases, but not enough of the technique is given to enable one unfamiliar with the subject to practice it. Hysterectomy and the allied operations are most ably treated. A careful review of the different methods of operation is given and also the intra and extra-peritoneal treatment of the stump. Statistics are given to show a mortality of 4.2 per cent. in favor of the extra-peritoneal method.



The clinical picture given of malignant disease is a most perfect one, for the incipient disease as well as for the latter stages. Little time is spent considering the causes of cancer; endorsement is given to the theory of heredity, and little mention is made of cervical laceration.

In the treatment preference is given to the knife as a means of removal, when the disease does not affect the vaginal walls; however, strong preference is given to total hysterectomy, even when the disease is circumscribed. C. Braun is referred to as using the cautery, but no mention is made of the work of Dr. Byrne, of Brooklyn, who we believe, has done the best work in that line. The statistics of Hofmeier and Baker on high amputation which show fifty per cent. of cures after two years are considered "truly too fine," and Pozzi states that the demonstration is almost made that the mortality of hysterectomy is not higher than that of high amputation of the cervix. The vaginal method of hysterectomy is considered the best, and the use of ligatures rather than forceps, to control hemorrhage. The description of the operation is very plain and concise and but little burdened with the usual mass of details which so often obscure the salient points. The chapter on displacements of the uterus is somewhat disappointing; here again, the great prominence which is given to metritis is shown when the statement is made that anterior displacements are caused and kept up by it. The treatment of anteversion, as it should, receives but little attention, save by the removal of the cause. No faith is placed in pessaries, and amputation of the cervix is preferred to any of the plastic operations of discission.

In posterior displacements a distinct difference is made between flexion and version, flexions almost always happening as a result of puerperal metritis. The use of the sound is advocated to reduce a retro-displaced uterus; as a rule, with but few exceptions, we consider this a dangerous practice. Any uterus that cannot be put in position by bi-manual manipulation, with the patient on her back, should not as a practice be replaced with a sound. The statement is made that a ring pessary has reduced a posterior displacement without the aid of the surgeon. Under the surgical treatment a detailed account is given

of the different operations, and much credit to that of Alexander, fixation to the abdominal wall being left only for those cases which are irreducible without the aid of an anæsthetic.

Descent of the uterus and cystocele and rectocele are treated together. Not much value is attributed to the various mechanical devices so liberally invented by many gynæcologists, and in the surgical treatment alone is dependence placed.

Colpo-perineorrhaphy is not considered to the extent that its worth demands. In its performance preference is given to the methods of Hegar and Martin, and no mention of Emmet's operation is made.

To the anterior wall only about half a page is devoted, a denudation is mentioned as Emmet's, which unmodified he (Emmet) has not practiced for years.

Nothing new is said on inversion of the uterus, the author advocating the gradual method of reduction in chronic cases.

The volume closes with a short chapter on the disorders of menstruation, but much that might have been said here would have been but a repetition of matter in previous chapters.

The work of the translator is well-done.

L. C. BALDWIN.

**SURGICAL DISEASES OF THE OVARIES AND FALLOPIAN TUBES, including Tubal Pregnancy.** By J. Bland Sutton, F.R.C.S., Assistant Surgeon to the Middlesex Hospital, London. 12mo. 513 pp. Philadelphia, Lea Brothers & Co., 1892.

This book is divided into four parts, which are devoted respectively to Diseases of the Ovaries, Diseases of the Fallopian Tubes, Tubal Pregnancy, and to methods of performing operations for ovarian and tubal disease. The author has approached his work in the spirit of exact research, accepting as facts only those which are demonstrable in the pathological laboratory. In no department of surgery is the value of this kind of critical and philosophical inquiry more demonstrable than in that of pelvic affections. The immense amount of chaff which has accumulated, and which has swelled the literature of gynæcology requires sifting to get the wheat out of it.

The previous training of Mr. Sutton as anatomist, pathologist and surgeon has especially fitted him for this work. In the elucidation of obscure points he has availed himself of the help of comparative anatomy and physiology wherever possible. An excellent example of this occurs in his observations upon the physiology of normal menstruation, in his study of which he utilized Macaque monkeys, the uterus of which animal, in shape and even the structure of the mucous membrane and disposition of glands, is so similar to that of the human species that it may be considered as a miniature human uterus. He further studies the mucous membrane of uteri obtained from young women dying during menstruation, also the mucosa of Fallopian tubes removed surgically while menstruation was present. These are the sources which he relies upon for facts as to the conditions of the mucous lining of the uterus and tubes in menstruation. His conclusion is interesting and simple, viz.: In the human female the mucous membrane of the Fallopian tube undergoes no structural change during menstruation; in the uterus any distinctive change is limited to shedding of the epithelium, and it is doubtful if this occurs normally. He confesses, however, that as to the cause, significance and utility of menstruation, we know nothing! He concludes that the process of ovulation and menstruation are independent and not necessarily coincident. He states as incontrovertible facts that in the human ovary ovulation begins as early as in the seventh month of intrauterine life, and is an active process during the first year of life. Then occurs a period of comparative repose, until the tenth or twelfth year, when the ripening of ova again begins, and goes on independently of menstruation even after the accession of the climacteric. Maturation of ova is going on constantly, and the presence of a ripe ovum concurrently with menstruation is a coincidence. Nevertheless the intimate relation of the ovaries to the menstrual function is indisputable. What the nature of the relation is, and how the control of the ovaries over the process is effected, is still to be ascertained. The important surgical fact remains that the removal of the ovaries and tubes will, with very rare exceptions, be followed by a permanent cessation of the menstrual function.

The chapter on Oophoritic Cysts is an excellent example of the grasp of the author on his subject. It is brief, but, after reading it, one cannot but feel that a clear, systematic and comprehensive presentation of this most important subject has been given. The text is elucidated by frequent illustrations. The following observation by the author explains his method, and the value of the observation cannot but commend itself to every one. He says: "It is only by patiently waiting for opportunities of securing cysts in very early stages that it is possible to elucidate their mode of origin. Much of the confusion which obscures the pathology of this question is due to the fact that most investigators have devoted their attention to large cysts."

The section of the book devoted to the diseases of the ovaries he closes with the following practical observation on the mortality attending operations for removal of ovarian tumors: "It would be interesting to be able to state definitely the risks of operation in each class of tumor; this will be impossible until surgeons feel disposed to accept some definite method of classification, and arrange their cases accordingly. Speaking generally, it may be said that in experienced hands the mortality varies from five to ten per cent. Here and there a few operators have published long runs of cases without death. This is very encouraging; but when large series of cases are collected the average mortality stated will be maintained. With less experienced operators the mortality after ovariectomy will vary from fifteen to twenty per cent.

As a prelude to the diseases of the Fallopian tubes he devotes a chapter to the anatomy of the tubes, the chief part of which is given to a demonstration that the folds of the tubal mucosa are glands whose probable function is to provide an albuminous fluid for the ovum as it traverses the Fallopian tube. Then follows a chapter devoted to salpingitis and its effects, which he states to be nearly always secondary to inflammations of the genital tract, *i. e.*, septic endometritis, gonorrhœa and cancer of the uterus. The sequence of the various processes are clearly traced which terminate in the closure of the abdominal ostium of the tube and the distension of the tube

with retained inflammatory products—hydrosalpinx and pyosalpinx ; also in the involvement of the pelvic peritoneum and the ovary. Chronic salpingitis, he states, upon the results of post-mortem examinations, to be very frequently found in individuals in whom the existence of such conditions was not suspected during life. As to dilated tubes filled with blood clot, his observations have convinced him that nearly all the specimens supposed to be examples of hæmato-salpinx are really gravid tubes in which a sufficiently careful examination will disclose some trace of an embryo or of chorionic villi. Tubercular salpingitis is described, and as a practical point in its diagnosis it is noted that while in the common forms of salpingitis the patients, whether single or married, not infrequently furnish a history of gonorrhœa or septic endometritis, the majority of reported cases of tubercular salpingitis have occurred in young women whose life in this respect is above suspicion. In girls about puberty any form of salpingitis, other than tubercular, is very exceptional.

Again, in discussing the diagnosis of chronic salpingitis the author states that it is a very common disease, and one that not infrequently imperils life ; even in cases where life is not endangered the pain and inconvenience the patients suffer are often such as to render their existence miserable. In this connection naturally follows a description of its differential diagnosis from other conditions that may simulate it, especially small tumors of the ovary, retroversion of the uterus, and parametritis. In the matter of treatment, importance is given to the medical treatment of the initial or acute stages of the affection, by means of which the prevention of much subsequent misery is possible. When, however, the mucous membrane of the tubes has become seriously damaged, the tube itself fixed by adhesions to surrounding structures, the ovary involved in the inflammation, and the lumen of the tube occluded, then the author admits drugs are of little avail. The following paragraph in which Mr. Sutton formulates his conclusions as to the treatment of such cases is a model of clear and forcible surgical teaching. He says : "The ordinary rules of surgery suggest that when the physical signs and history of the case indicate that the tubes are occluded and distended with pus

or other fluid, producing so much pain and inconvenience as to cause the patient to lead the life of a chronic invalid, then it is justifiable to remove them by abdominal section. To dilate and scrape the interior of the uterus in such cases, to tap them through the vagina, or attempt to disperse them by electricity, by moorbaths, or by mild purgatives, are modes of treatment which can only be described as ridiculous, and in many cases they are highly dangerous. It must be confessed that the whole difficulty in the treatment of these cases lies in the diagnosis. If the surgeon could be sure his patient were suffering from a collection of pus in the tubes he would have no more hesitation in removing them than he feels in recommending the excision of a sacculated and suppurating kidney."

The chapters treating of tubal pregnancy are exceeding interesting, and one is charmed with the clear and logical manner in which the author simplifies this subject and reduces to order the mass of chaotic observations that have hitherto accumulated. Tubal pregnancy is a much more common occurrence than has generally been recognized, but like its fellow tubal affection, salpingitis, it has only to be described in its more common types, and the profession taught to recognize it, for it to assume its proper place in pelvic pathology. Surgically the great epoch in the history of a tubal conception is the rupture of the tube, which, unless the ovum perishes from other causes at a very early date, is rarely deferred beyond the twelfth week. If the rupture is intraperitoneal, hemorrhage into the peritoneal cavity results, the amount depending upon the degree of the development of the ovum. After the first month the bleeding is usually very copious, and may cause death in a few hours. In a fair proportion of cases, however, the rupture is along the floor of the tube and opens into the connective tissue spaces of the broad ligament, among the meshes of which the blood is effused, and by the pressure of which it is prevented from assuming dangerous proportions. An hæmatoma of the broad ligament is thus produced. At this point in its history the embryo may perish, and ultimate recovery after absorption of the hæmatoma ensue. But in some instances the embryo remains uninjured and continues its development, while space is made for it



by the gradual separation of the layers of the broad ligament, and the later stripping up of the peritoneum from the pelvic viscera and walls. This sac again may rupture at any period of its development with a repetition of the hazards and consequences of the primary rupture, or it may remain intact while the fetus goes on to develop, usually feebly and imperfectly, to term, or the fetus may die at any period of its development, undergoing thereafter various degenerative changes while it is retained indefinitely in the body of the mother, or becoming infected by septic organisms is converted into a vast abscess filled with broken down and necrotic fetal debris. This is a brief outline of the chief facts of tubal gestation as given by the author. Tubal abortion, tubo-uterine and cornual gestation are also described. As to the treatment of tubal pregnancy Mr. Sutton declares for abdominal section as soon as the diagnosis is established, except in those cases in which there has occurred rupture into the tissue of the broad ligament with death of the embryo. He refuses to give any consideration to methods for killing the fetus by injecting drugs into it, or by passing electrical currents through it, procedures which he characterizes as unsurgical and unsatisfactory.

The concluding section on methods of performing operations for ovarian and tubal diseases presents very clearly the generally practiced technique of such operations. Nothing is said about the advantage derivable from the Trendelenburg elevated pelvis position in such cases. The conditions in which drainage is indicated are judiciously elaborated and its practice commended. Abundant irrigation of the peritoneal cavity is advised whenever there has been much oozing from separated adhesions, or pus or other secretions have flowed into the cavity. In the practice of irrigation the author suggests the use of a little common sense upon the part of the surgeon, and maintains that plain water at a temperature of 110° to 115° F., is the safest medium to use.

We have thus sketched the character of this book of Mr. Sutton's. We have read it with pleasure and profit. Its methods and manner commend it to one's judgment as a reliable and comprehensive statement of present knowledge and practice in the domain of the surgery of the uterine appendages. LEWIS S. PILCHER.

TRANSACTIONS OF THE AMERICAN SURGICAL ASSOCIATION. Volume IX. Edited by J. EWING MEARS, M. D., Recorder of the Association. Philadelphia, 1891. Large 8vo., pp. 508.

This volume contains the work of the meeting of the association in Washington, D. C., in September, 1891, during the Congress of American Physicians and Surgeons, and, in consequence of the international character of the discussions, as well as the intrinsic value of the papers themselves, it forms an exceedingly valuable, if not the most valuable, volume of the transactions.

The paper of Senn on the treatment of bone and joint tuberculosis appeared in full in the January Annals. Three of the papers are devoted to cerebral and spinal surgery. The first, the present status of brain surgery, as practiced by Philadelphia surgeons, by D. Hayes Agnew, M. D., of Philadelphia, covers the field of operative surgery of the skull and brain in a most satisfactory manner. Dr. Agnew, however, tried to lay down absolute rules of practice from too contracted a field of observation, and, consequently, when the broader experience of the association was drawn upon by the discussion he found himself exposed to decided and authoritative differences of opinion. It is a mistake to ignore the general literature of a subject and confine statistics to cases coming within the observation of a few surgeons practicing in a single locality, even though those men are fully equipped and experienced.

The second paper in this series, penetrating pistol shot wounds of the skull, by E. H. Bradford, M. D., and H. L. Smith, M. D., of Boston, is a review of the question whether, from the point of view of recent surgery, operative interference offers better chances of recovery than non-interference. The result of the study of the ninety-one tabulated cases leads to the decision that, inasmuch as the mortality is less in cases that have been trephined than in those where no operation has been undertaken, "the treatment of pistol shot wounds of the skull should be conducted on the same principles as the treatment of perforating fractures of the skull by a sharp instrument. That is, the wound should be thoroughly explored and thoroughly cleansed; all loose fragments should be removed, including

the bullet, if readily accessible. Drainage and strict asepsis are essential to the best results." In the final paper, the surgery of the spine, by J. William White, M. D., of Philadelphia, the whole field of operative surgery of the spine is gone over. Some errors are noticed in the tabulated cases; for instance, Jackson's case of removal of the laminae for Potts disease appears twice, and in neither this nor the table on cases of operation for traumatism of the spine are the statistics complete. This naturally affects the value of the statistical portion of the paper, but it is still a valuable contribution to our knowledge of this subject.

A most opportune, masterly and scientific discussion of the recurrence of carcinoma of the breast is contributed by Frederic S. Dennis, M. D., of New York. The general statistics of the operation are first discussed, and are followed by a resumé of the author's personal experience. These statistics, so far as we know, are the best yet published—at least as regards the mortality. If our memory is not at fault the percentage of recurrences corresponds exactly with the results presented to the French Academy some two or three years ago. The author concludes that "with early and radical operations the recurrence of carcinoma of the breast after removal of the gland will be, comparatively speaking, of rare occurrence."

Asepsis and antisepsis in operative surgery, by Arpdd G. Gerster, of New York, and aseptic operative technique, by George Ryerson Fowler, of Brooklyn, exhaust this subject. Both papers furnish valuable suggestions for the proper management of operative cases, and to a certain extent supplement each other. The report of the commission "on the results of treatment of simple fractures of the shaft of the femur," presented by Stephen Smith, M. D., of New York, is of very great value in determining, in an authoritative way, what may be considered as a successful result in this condition. Embodying as it does the views of nearly every member of the association its conclusions, even though they differ slightly from former teachings, cannot fail to carry conviction, and must exert much influence in deciding suits for damages. It is to be regretted that the report was not signed by all the commissioners, as that would have disarmed all possibility of criticism.

Oscar H. Allis, M. D., of Philadelphia, contributes an experimental study of "Fractures in the Upper Third of the Femur below the Trochanter Minor," in which he shows that extension is an inefficient method of treatment and advocates cutting down upon and wiring the fragments as the only possible means of obtaining successful coaptation without deformity.

Dr. Lewis A. Stimson, in two papers "The Treatment of Fractures of the Humerus Involving the Elbow Joint" and "The Treatment of Some Old Unreduced Dislocations of the Elbow," takes the opportunity to emphasize some of the commoner errors in the diagnosis and treatment of injuries about this joint. Taken together the two papers furnish most useful suggestions in regard to the surgery of this region.

"Intra-Thoracic Surgery: Bronchotomy Through the Chest Wall for Foreign Bodies Impacted in the Bronchi," by De Forrest Willard, M.D. Ph.D., of Philadelphia, furnishes a most valuable corroboration from the experimental point of view of the facts that were brought out so strongly from a practical experience in the sad case so recently under observation in Brooklyn. As in that case bronchotomy was found impracticable, so the conclusions here point to its great difficulties and dangers. Low tracheotomy is advocated as the best means of attaining the end, and foreign bodies that cannot be removed by means of a low tracheotomy cannot be reached by the operation through the chest wall.

A report of a unique "Case of Diffuse Fibroma, with a Tendency to Intra-Canalicular Growth of Both Breasts," by C. B. Porter, M. D., of Boston; a paper by Albert Vanderveer, M. D., of Albany on "Retro-Peritoneal Tumors, their Anatomical Relations, Pathology, Diagnosis and Treatment;" "Fractures of the Bones Which Form the Elbow Joint and Their Treatment," by L. E. Lane, M. D., of San Francisco, in which he takes direct issue with Stimson's statement that under any treatment some cases of injury of this joint will inevitably result in permanent stiffness, and states that he is confident that if the fractures are dressed in the straight position, with early and long-continued passive motion, no fractured elbow would recover "indissolubly fastened;" "Dislocations of the Carpus," by J. S. Wight, M.D., of

Brooklyn, N. Y. ; and " Resection of the Wrist : Recovery ; Free Use of the Limb Restored to Its Normal Position," by R. Lavistra, M.D., of the City of Mexico, Mex., completes this most interesting collection of papers.

SAMUEL LLOYD.

ESSENTIALS OF MEDICAL ELECTRICITY. By D. D. STEWART, M. D., and E. S. LAWRENCE, M. D. 156 pages. 65 illustrations. 1892. W. B. Saunders, Philadelphia.

The object of this little work, as its name suggests, is to put into the hands of medical students and busy practitioners, in a condensed form, the principles of the science of electricity and their application in the practice of medicine.

The scope of the work is a large one, treating as it does of nearly all the topics found in the larger works on electricity.

The selection and arrangement of material is done in a skillful manner. The less practical subjects, and those with which the average practitioner is familiar, are dismissed with a few words ; while some of the more difficult and useful subjects, including electrical units, measurement of currents and arrangement of cells for large or small external resistance, are treated of comparatively fully. Reaction of degeneration, its definition, cause and determination being the subject which most often causes the doctor to consult his books, is treated of with especial care and clearness, mentioning all the smaller details necessary for its successful determination, and showing withal that the author is writing from a thorough practical knowledge of the subject.

The newer method of the therapeutical application of statical electricity is well illustrated and described in part by quotations from an enthusiastic paper by Dr. Morton, of New York.

Part II gives a list of about forty diseases amenable to treatment by electricity and the most approved mode of application in each case. Its limit of usefulness in many of these disorders is not fully given, but that, no doubt, can be determined only too soon by the observing physician.

Compared with works of its kind, which certainly have a place among busy practitioners and students with whom a book frequently increases in value in inverse proportion to its size, this one has been eminently successful in presenting a good working knowledge of the subject.

G. R. WHITE.



## OBITUARY.

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### D. HAYES AGNEW.

DR. D. HAYES AGNEW, Emeritus Professor of Surgery and Honorary Professor of Clinical Surgery at the University of Pennsylvania, died at his home, 1601 Walnut Street, Philadelphia, on Tuesday afternoon, March 22, 1892, in the seventy-fourth year of his age.

After more than half a century of most assiduous work in his profession, continued almost uninterruptedly up to the time of his death, the end came, fortunately for him, quickly and peacefully. Although he had been ill on several occasions in the past few years, no serious results had occurred until the sudden development, ten days before his death, of an attack of angina pectoris, caused, as was afterward proved, by stenosis of the left coronary artery of his heart. Speedily arose other symptoms due to degeneration of the kidneys, which was slowly progressive, the immediate cause of his death being uræmia.

Dr. Agnew was born, November 21, 1818, in Lancaster County, Pennsylvania. He was the son of Dr. Robert Agnew, who was for many years the leading practitioner of his region. From both father and mother he was of Scotch-French descent, a race that is singularly industrious, God-fearing and intelligent. His mother was Agnes Noble, a woman of extraordinary strength of character, and from her, undoubtedly, her famous son obtained many of the fundamental elements of his character. She came of a long-lived race, living to the age of ninety-one years. Dr. D. Hayes Agnew began his classical education at the Moscow Academy, a Chester county institution of the period, in charge of the Rev. Francis Latta. He continued his studies at Jefferson College, Canonsburg, Pa., subsequently completing his general education at Newark College, Delaware. Selecting medicine as a profession, he entered upon its study at the University of Pennsylvania, whence he graduated April 6, 1838. Returning to his native place, he entered upon the practice of medicine, and was

married to Margaret Creighton Irwin, daughter of Samuel Irwin, of Pleasant Garden Forges, in 1841. To her assistance and advice he ascribed much of his later success. After some years of practice in Lancaster and Chester Counties he was persuaded to accept a very flattering offer to assume control of the large iron interests of his father-in-law. He remained in this business for three years, when its failure induced him to return to the practice of medicine. He had demonstrated his business abilities, but the causes which led to the failure of the firm of which he was a member were totally beyond his control. His love for anatomy and dissection made his surroundings in the country uncongenial. Feeling that if he would advance he must seek a larger field, he came to Philadelphia in 1853. He was then in early middle age, being thirty-five years old. Contrary to the usual law, his great successes have been acquired since that time. In 1854 Dr. Agnew was chosen one of the surgeons of the Philadelphia Hospital, where he left a perpetual memorial of his labors in the founding of the present Pathological Museum, of which he was a long time curator, and rendered great service in opening the clinical material of the hospital to the use of students. At the same time he began the delivery of lectures at the Philadelphia School of Anatomy. So widely known did the School become that at the outbreak of the civil war his class numbered 265 students, representing nearly every State in the country, and being the largest class studying under one teacher. In this connection he also established the Philadelphia School of Operative Surgery. In 1863 he became Demonstrator of Anatomy and Assistant Lecturer on Clinical Surgery in the Medical Department of the University of Pennsylvania. He brought to the University a well-grown reputation as an operator and a teacher. In 1870 he was made Professor of Clinical Surgery, and in 1871 John Rhea Barton Professor of the Principles and Practice of Surgery. This chair he held until 1889, when he retired from active service at the University, the position of Honorary Professor of Clinical Surgery being created for his honor and for opportunity to continue occasional instruction.

He was surgeon to the Wills Eye Hospital, being chosen in 1864. One year later he was appointed on the surgical staff of the Pennsylvania Hospital, but the inauguration of a policy

with which he could not agree compelled him to resign. But in 1877 the Board of Managers of that institution, of their own volition, re-elected him to his former place, an occurrence without parallel in the history of that institution. In 1867 he was chosen one of the surgeons at the Orthopædic Hospital. He took an active part in the building of the Presbyterian Hospital, and shortly before his death that hospital bestowed upon him unsought the title of Honorary Surgeon, he being the only one who has ever held that position.

An experience which proved most valuable was his service as consulting surgeon at the great Mower Hospital at Chestnut Hill. It was the largest hospital in the country, being under the care of forty-seven resident physicians. Dr. Agnew acted as a consultant general and all the dangerous cases and difficult operations came under his hands. At one time he had 5,000 patients, with gunshot wounds, under his care.

Dr. Agnew had been President of the Philadelphia College of Physicians, the County Medical Society, the Philadelphia Academy of Surgery, the State Medical Society, the American Medical Association and the American Surgical Association.

For more than thirty years Dr. Agnew has stamped his impress not only upon the surgical tone of his ever-widening circle, but he has given a distinctly elevated character to the surgical atmosphere of his city and country. Great as have been the many learned teachers of the University of Pennsylvania, none have brought more honor to her walls than D. Hayes Agnew. His skill in presenting great surgical truths, both didactically and clinically, his mechanical dexterity at the operating-table, combined with his calm, clear and accurate judgment, his keen insight into disease, rendered him famous over two continents, and steadily increased his own renown and that of his *Alma Mater*. In his middle life specialists in surgery were practically unknown. For many years he was one of the best operating ophthalmologists in the city; he was a skilled gynecologist, and in genito-urinary troubles his success was most brilliant. In his early days the division between general medicine and general surgery was not so distinctly drawn, and up to the time of his death there was no consultant in Philadelphia whose opinion was more

highly valued in regard to many diseases of a strictly medical character. His interpretation of results to be obtained by palpation in any part of the body was often wonderful. His fingers, his hands, his eyes, and all his senses were so thoroughly educated that his deductions were speedily and thoroughly made, his errors being few.

In consultation his manners and his methods were inimitable, and placed his services in constant demand. If he felt that any error in diagnosis had been made by the attending physician, the correct interpretation of the symptoms was placed before him with such skill that not only was the patient ignorant of the fault, but the physician himself was half inclined to believe that his own astuteness had discovered the error. There was never any attempt at self-exaltation at the expense of others. His services were in demand far and wide, and each of the thousands of physicians, whom he sent to all parts of the country during his forty years of teaching, loved him as a personal friend. His magnetism was most remarkable.

As a teacher with knife in hand and cadaver before him, his clear concise instruction was so remarkable that a subject hitherto incomprehensible to students seemed as clear as day. No one ever forgot his demonstration of the surgical anatomy of the perineum or of hernia. His eloquence sprang from a thoughtful mastery of his subject and an enthusiasm engendered by an ardent love for his work. His industry was prodigious. Early at work in the morning, he steadily but quietly pursued it through the day, and often spent the nights in journeys to distant points for consultation, returning on the following morning to resume his full measure of labor. His practice was enormous, and yet he never slighted a case. He was markedly reserved, yet always cheerful; quiet, but never depressed. He never spoke words of bitterness or anger, although he could be firm when needed.

As a writer his great "System of Surgery" will stand as a monument of a unique experience, of one man's knowledge of surgical disease. Each subject is treated in the most encyclopædic way, and yet it is rounded out and made complete by his own personal experiences. Written, as the work was, amidst the demands of practice and in hours stolen from sleep, the mechan-

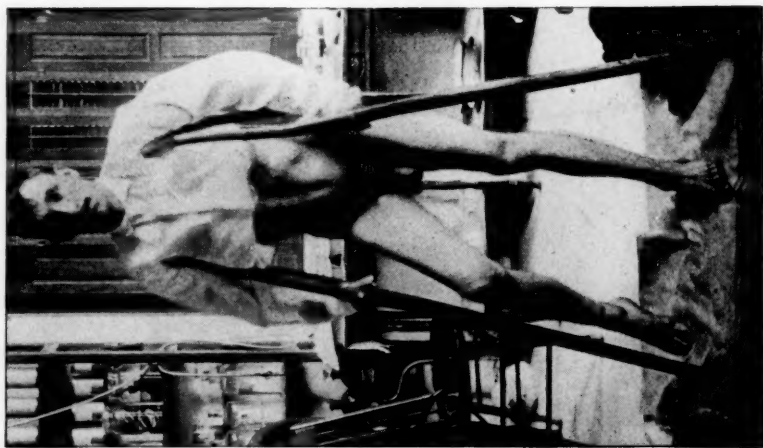
ical labor alone, and the amount of research it necessitated, would have appalled any less vigorous worker, but he was able not only to complete it, but to give the time for revision for a second edition. He issued also a "Practical Anatomy for Dissectors," essays on "Lacerations of the Female Perineum," "Vesico-vaginal Fistula," and "Anatomy in Relation to Medicine and Surgery." In addition, he has contributed extensively to medical journals. The last paper he wrote was on "The Present Status of Brain Surgery, Based on the Practice of Philadelphia Physicians."

A staunch and faithful member of the Presbyterian Church, he was rarely absent from his place at its services, and in his private life, in daily contact with his family, his virtues and magnetism were even more marked than they were as shown to the public. His qualities of heart were such that volumes might be written of this man's deeds of kindness to rich and poor. He was a true, sincere, honest Christian man. He has left an example to all the profession, and in his life fully exemplified the graces which adorn a Christian life.—*From the University Medical Magazine.*

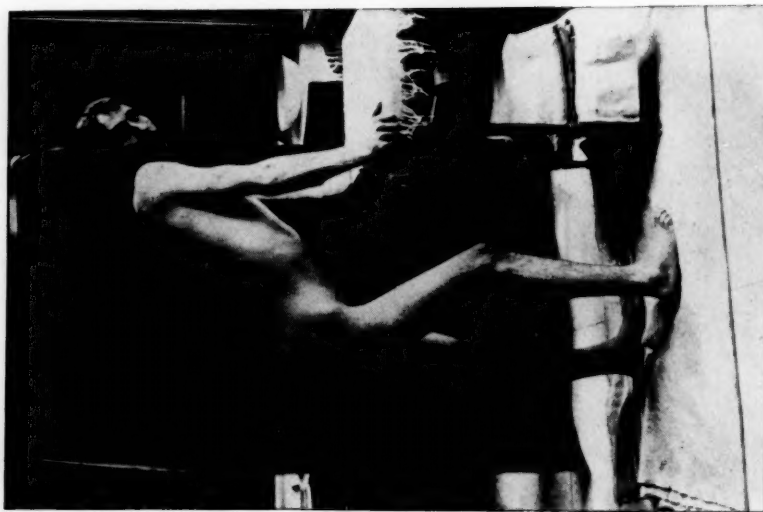




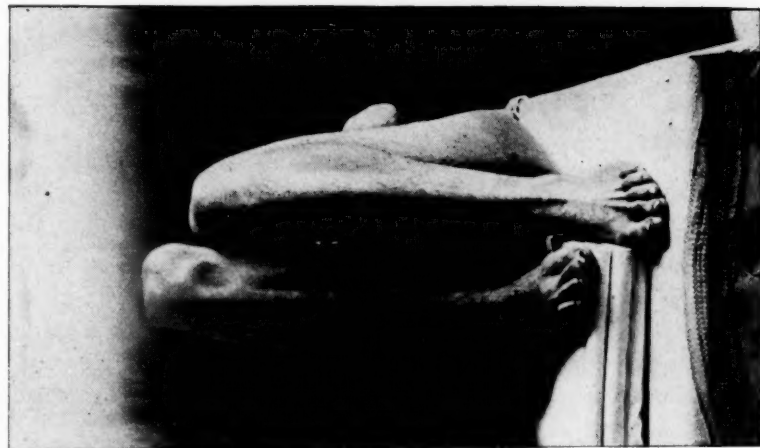
EMMET HAWKES.—From Photographs taken by Charles F. Nassau, House Surgeon of the Presbyterian Hospital.



*Fig. 1.*



*Fig. 2.*



*Fig. 3.*

In studying the various postures presented the effect of fixation must be borne in mind. This is especially necessary in reference to Fig. 3, which should be compared with Figs. 4 and 5 of the text.

REPORT OF A CASE OF OLD DISLOCATION OF HIP—  
ATTEMPTS AT REDUCTION FOLLOWED  
BY FATAL HEMORRHAGE.

By OSCAR H. ALLIS, M. D.

OF PHILADELPHIA.

SURGEON TO THE PRESBYTERIAN HOSPITAL.

EMMET HAWKES, Gazzan, Va.; 24; single; laborer in the mines; previous health good. While at work, October 10th, 1891, with a pick, a piece of loose rock and small stones fell upon him, striking the right hip, causing great pain and deformity; was unable to walk. He had the immediate care of a physician, and afterwards was placed in bed and retained, with limbs tied together. He remained in bed but a few days. On rising he went about with crutches, with the deformity depicted in the accompanying figure. See Frontispiece. (Fig. 1.)

Patient reached Presbyterian Hospital 1-7-92, and was placed in the Patterson free bed.

Present condition: Patient is in a very helpless condition; requires two crutches to enable him to stand or move about. Right limb stands awkwardly off from the body, semiflexed and abducted. It is impossible to bring the foot to the ground with the body in the erect position. The outer gluteal region is flattened (fig. 2) and unsupported. There is a notable fullness below Poupart's ligament, and in the obturator region (fig. 1), and on deep pressure a hard resisting mass is felt, like the head of a femur. The axis of the femur, traced upwards, leads to this point. The movements of the patient are subordinated to the position of the limb, as if the latter were fixed, and strain upon it induced pain. The patient can bring his foot to the ground (fig. 2) by leaning forward and supporting the weight of his bent body upon a table.

When the patient is placed upon his back there is great apparent elongation of the dislocated femur. This, however, is due to fixation of the head in its new bed in the obturator region. In order to bring the right femur into a vertical position the pelvis must be decidedly tilted, owing to fixation of the dislocated femur. See photo, opposite.

In figure 4 the pelvis is represented as horizontal with the right dislocated hip abducted. If the patient was assisted to place the limb perpendicularly, the pelvis tipped, as in figure 5, giving the appearance of decided lengthening.

January 9th, thirteen weeks after the accident, reduction was undertaken. The patient was etherized by Dr. Reynolds and laid upon a mattress upon the floor. Then, in the presence of my colleague, Dr. Willard, Prof. Brinton, of Jefferson Medical College, Dr. Nassau, my senior assistant, Drs. Pearce, Shoemaker and Mr. Ward Brinton, I took hold of the limb, and gently rotating it, felt a decided grating, as if I were tearing it from attachments. This done I flexed the limb, and rotating inward, i. e., carrying the foot towards me, the head was suddenly changed into a dorsal dislocation with its characteristic phenom-

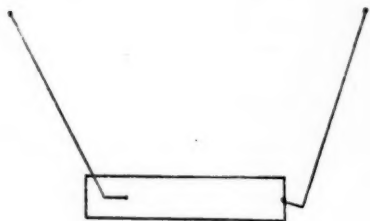


Fig. 4

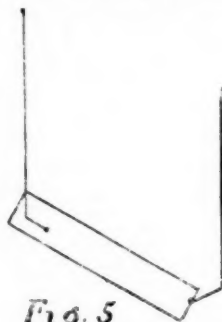


Fig. 5

ena. I then put my flexed left arm in the popliteal space, and while I lifted, I rotated the head inwards to avoid the lip of the acetabulum, and when I felt that I had reached the level of the acetabulum I rotated outward, at the same time with gentle outward circumduction extended the femur. The attempt was followed by reduction of the deformity as far as abduction was concerned, but there persisted a degree of abnormal flexion.

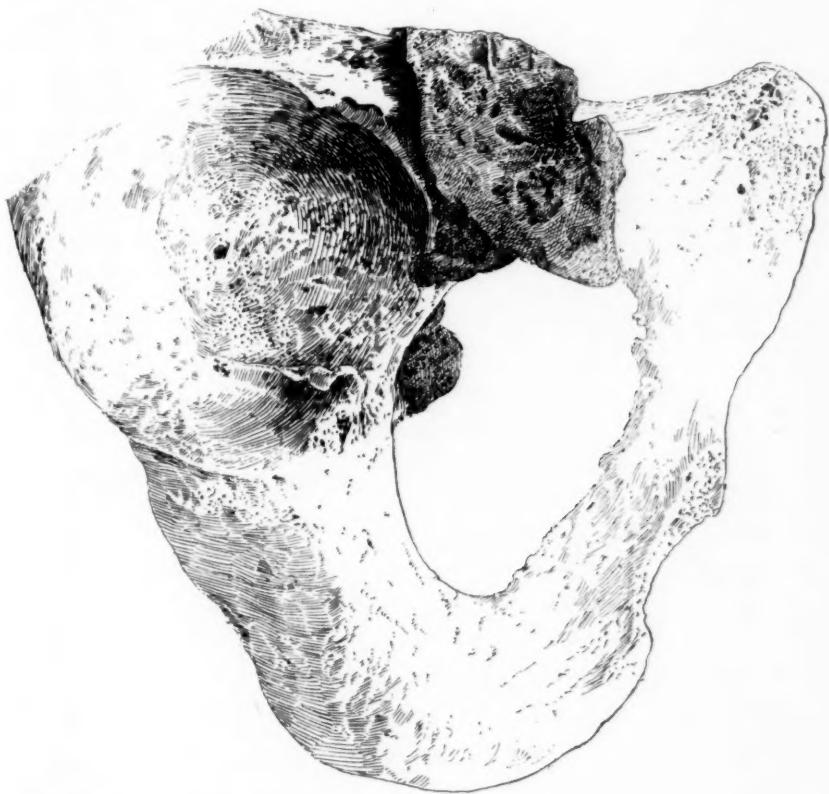
Failing after various attempts to reduce a dorsal dislocation, I undertook to reduce it directly from the obturator region, and during manipulations the condition of the patient became critical—i. e., blanched and pulseless.

To what the shock was due I was unable to determine. Although there arose a gentle fullness in the anterior femoral region, there was nothing to indicate a serious hemorrhage, and feeling that the shock was partly due to manipulations, stimulants hypodermatically with warmth to the body were administered, with the effect of recovery of pulse and consciousness. The ankle pulse came up decidedly and thus

allayed all fear of arterial (femoral) rupture. The patient asked about his condition, complained of pain, and for a time gave promise of rallying. He sank, however, and died at 3.20 P. M. Patient under ether about half an hour.

*Autopsy* 24 hours after death:

Present—Drs. Brinton, Willard, Porter, Mattern, Nassau, Pearce, Reynolds.

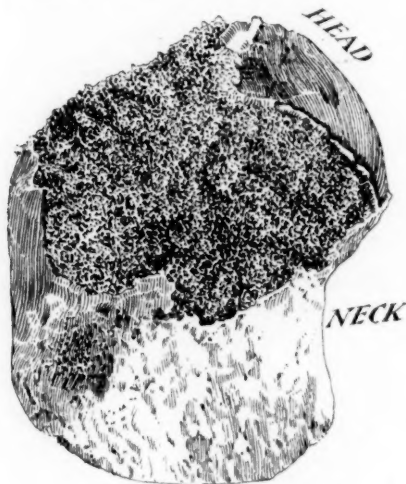


*Fig. 6.*

Right groin swollen and discolored. Patches of ecchymoses throughout entire leg. On removal of a large flap over right inguinal region extravasated blood was found disseminated through the connective tissue, but no clots. Blood more abundant beneath deep fascia, but not sufficient to give rise to a suspicion of dangerous amount. Blood traced into abdomen and found in quantity in the right lumbar fossa, *i. e.*, to the right of the lumbar vertebra, extending

as high as the kidney. The peritoneum was pushed forward and bulged with the long underlying hæmotoma. The source of hemorrhage was ascertained to be at the junction of the superficial with the deep femoral vein. The hemorrhage had followed the sheath of the deep femoral vessels and escaped into the abdomen between layers of the retro-peritoneal fascia. The locality of the rupture explained why there were no well-marked signs of hemorrhage at the point of laceration.

On the inner aspect of the acetabulum, but not springing from it or encroaching upon it, were exostoses of various sizes. The largest was an inch in diameter, and projected horizontally half an inch in advance of the normal structure.



*Fig. 7.*

The head of the femur was almost entirely denuded of cartilage, and presented the unprotected cancellous structure similar to what is seen in advanced hip disease. The acetabulum was found full of fine pulpified muscular tissue. This, on removal, revealed a normal acetabulum. It had not shrunk, nor become filled up by fatty tissue, nor did it present any obstacle to reduction save the muscular fibre already mentioned.

At the autopsy I found no obstacle to reduction, and have no doubt that the head was carried into its socket by my earliest manipulations. The autopsy explained why, after reduction, there was resistance to complete extension, viz., an acetabulum filled with pulpified muscle. The capsule was largely torn save the ilio-femoral band.

The head of the bone was somewhat diminished in size, and could not, from its softened vascular condition, have yielded the peculiar response that is so characteristic of reductions.

The awkward flexion and abduction was due in a great measure to the sartorius muscle, which was drawn tense and acted like a long ligament.

#### REMARKS.

There is room for speculation as to the cause of the laceration in the vessels. This laceration was, as previously stated, at the junction of the superficial and deep femoral veins. There was no severing of one from the other, but a splitting at the crotch. The split was ample for the escape of nearly the full column of blood, and had the flow not been checked by the sheath of the vessels death would have been immediate.

It was the opinion of those who witnessed the autopsy that the vessel had been carried against the sharp edge of the exostosis, (Fig. 6) and the near approach of this excrescence to the seats of the vessels gives color to such a theory.

In connection with this, however, must be considered the condition of the head of the femur. It was not smoothly polished, glistening, as it is under normal conditions, but denuded of cartilage, and as rough as the carious head in advanced hip disease; under such circumstances the head in being carried about over the tissues had a tendency to drag upon them.

At first these theories quite satisfied me, but upon maturer thought queries arise that cannot be explained away by them. If the hemorrhage was due to dragging the vessel against this sharp exostosis, why should the arteries escape which lay in closer proximity to the dislocated head? The solution of the hemorrhage is, I believe, readily solved upon a purely anatomical principle. It will be remembered that the hemorrhage was from a tear or split at the junction of the superficial with the deep femoral vein. Now these two great blood channels are separated by the fascia lata. The saphena lies *above*, *i. e.*, superficial to it, while the femoral vein lies upon the floor of Scarpa's triangle. When, then, the circumductions of the femoral head took place its plane of action was between the planes of these vessels, and coming against them at their junction beneath the cribriform opening, forced them assunder, acting as a wedge.



There was a condition that favored this laceration, viz., the inflammatory processes that unified the tissues at the seat of the displaced head. Dr. Brinton called my attention to adhesions of the blood vessels in the vicinity of the rupture. Such a condition would render the vessels less free and less capable of accommodating themselves to tension, a tension all the more probable from the roughened head of the femur.

In the following case, it is worthy of note that the hemorrhage was from the femoral vein, and probably due to sudden traction of the superficial upon the deep femoral vessels.

A mounted artilleryman, while galloping, fell from his horse in front of the gun, and his left leg was bent back so violently that the heel lay against the back of his shoulder, and the head of the femur with the torn ligamentum teres projected through the fold of the groin. There was profuse bleeding from the femoral vein, and the man died within twenty-four hours.—*Abstract in Central blatt für Chirurgie*, 1880, p. 504. *From Stimpson Dislocations*, 1888.

1604 Spruce St.

## ON EXSECTION OF THE KNEE-JOINT.

By J. S. WIGHT, M. D.,

OF BROOKLYN.

PROFESSOR OF OPERATIVE AND CLINICAL SURGERY AT THE LONG ISLAND  
COLLEGE HOSPITAL.

I HAVE exsected the knee-joint for the following reasons:  
1. To cure disease of the joint tissues. 2. To arrest infection of the general system. 3. To remove, as far as possible, the disability of deformity. 4. To avoid amputation of the thigh. Any one of these reasons is a good one for the performance of exsection of the knee-joint. It seems to me there is no excuse for not performing this operation if these reasons are present in a given case. Admit that it is a difficult operation to perform, but that does not prove we ought not to resort to it. The question is: What is the best we can do for our patient?

In many instances we have tubercular disease of the knee-joint. It often happens that this disease begins in the sub-synovial tissue, much as tuberculosis of the lungs begins in the sub-plural tissue. When the disease has made a certain degree of progress we call it "white swelling" of the knee. I suppose that this name comes from the fact that the knee is swollen and that it is white at the same time. If this disease cannot be cured by means other than operation, then I advise exsection of the knee in order to remove the affected tissues and prevent any serious systemic infection. That tuberculosis of the knee can be cured by such an operation is attested by abundant proof. I have cured several cases by means of exsection of the knee, even when I have not been able to remove all of the affected tissues.

If we have a local infection, there is danger of the infecting material being carried to susceptible parts of the body. There is no better illustration of this fact than the one we find in the case of a local tuberculosis, such as we have in white swelling of the

knee. Such a disease of the knee, which cannot be cured by means other than operation, will in time destroy the life of the patient, because of the effects of general infection. Assume that exsection, as we know it has, will cure the local disease; and then we may assume that general infection will not take place. Hence we prevent infection, and cure our patient by exsection of the knee-joint.

In some instances we have an immovable ankylosis of the knee, with the leg so far flexed as to produce serious disability. There is not only unsightly deformity, but the patient has great difficulty in trying to walk and gets about only in a manner that is uncomfortable and unhappy. It may be necessary for the patient to use complicated and unsightly appliances, as well as crutches, in order that it may be possible to go about at all. The patient is crippled in every attempt to do anything, and cannot engage in the ordinary pursuits of life. These cases may be developed by injury, as well as from disease. I have seen cases of both kinds of etiology: and the two causes may co-operate. A patient may have a "white swelling" cured in such a way as to leave a knee very much flexed and deformed. Another patient may have an injured knee followed by so much pain as to obstruct any attempt to keep the limb straight during the treatment.

In the cases under consideration one of three results may be obtained: 1. A deformed knee with more or less ankylosis. 2. A thigh-stump which may be longer or shorter. 3. A rigid limb with a slight bend where the knee has been exsected. A consideration of what is the best result will lead us to certain conclusions. Of course, a normal, or a nearly normal, knee is the standard result. If we can get an ankylosis of the knee-joint, with the leg bent slightly upon the thigh, accompanied by the removal of the cause of the disease, our patient would have a very useful limb. Such a result would be better than an exsection or an amputation. If a leg is much bent upon the thigh, there being ankylosis of the knee-joint, the limb will be deformed and disabled, and the walking and the working capacity of the patient will be impaired. In such a case, even if the cause of the disease has been removed, a proper exsection of the knee is advisable, because it will enable the patient to do better work and walk more readily. The removal of three or four inches from the

lower end of the femur, though it makes the limb so much shorter than the other, is not a contra-indication to an operation.

In a case of right-angled ankylosis of the knee-joint, with the leg projecting backward, the leg may be amputated in the upper third, leaving a short stump projecting backward; such an operation would leave a good surface for pressure upon an artificial limb. Yet even in such a case, I am inclined to think that an exsection of the knee would be better than an amputation of the leg. On the other hand, it might, perhaps, be preferred to an amputation of the thigh, since it might be more suitable for the application of an artificial limb.

If we compare the results of exsection of the knee with amputation of the thigh, we shall find that the former operation is better than the latter. The question is: Which operation gives the least disability? The surgeon who has had practical experience with both operations will have no difficulty in deciding in favor of exsection. Of course, after exsection of the knee, the femur and the tibia become, as it were, one bone. But it has these advantages over an artificial limb applied to a thigh-stump: It does not wear out; it requires less care; it is a more comfortable support; it is much better to walk with; it is not so much in the way; it gives the owner a more acceptable appearance. In some of my cases the limp has been very slight, the patient being able to walk for miles as fast as others who have entire limbs; but patients with artificial limbs on thigh-stumps not only walk slowly, but they limp badly; in a case of exsection of the knee there is no stump-end to get "sore" and cause the owner to "lay up" from time to time. We are not trying to say that a limb after exsection of the knee is in any way as good as one that is normal. The question is: Which is the best result, a thigh-stump or a limb whose knee has been exsected? The practical surgeon will answer in favor of the exsection.

Which is the more serious operation, exsection of the knee or amputation of the thigh? If both operations are performed under careful antiseptic precautions I think they are about equally serious, with, perhaps, at times a small advantage in favor of exsection. In a case that is fully adapted to exsection I think an amputation of the thigh, no doubt would be a more serious operation than exsection. In a case in which exsection

would be very likely to fail an amputation of the thigh would be preferable at the outset, since it would subject the patient to only one operation instead of two. Yet if there is a reasonable doubt, if it seems to be possible to save the leg, the surgeon may exsect the knee first, and perhaps have the good fortune to avoid amputation of the thigh; but if the exsection does not succeed, then the thigh may be amputated, and the life of the patient saved. In some cases, however, there is no question as to the necessity of amputating the thigh at once, since the disease of the knee has so far progressed as to make it impossible for the surgeon to save the leg. My point is to give the patient the benefit of a reasonable doubt in favor of saving him a useful limb.

*The Operation.*—The point of the knife begins on the middle of the lateral aspect of one condyle, and cuts downward and around the upper end of the tibia about an inch below the knee-joint, and then upward on the other condyle to a point opposite where it began; the flap is dissected up from the capsule of the knee-joint, leaving the patella in situ, and then the joint cavity is opened by cutting through the ligamentum patellæ; the patella is removed by enucleation, cutting through the tendo-patellæ, and this is followed by incising the lateral ligaments; the lower end of the femur and the upper end of the tibia are now exposed by flexing the leg; the lower end of the femur is cut off with a narrow exsection saw, so as to leave the end of it convex from before backward; the upper end of the tibia is then cut off, so as to leave the surface concave from before backward: the object is to make the convex end of the femur fit into the concave end of the tibia; but if the ends of the bones do not fit so as to give them the proper angle, they should be sliced off with the saw until that object is accomplished. The angle of meeting of the two bones should be about  $160^{\circ}$  to  $165^{\circ}$ . In this operation ligation of blood vessels is rarely required. It is necessary for the surgeon to carefully avoid any injury of the popliteal structures; I have generally saved the posterior portion of the capsule intact.

I have fastened the cut ends of the bones together with nails and screws; about an inch and a half below the flap incision I make a vertical puncture with a small knife down to the tibia, and into this opening insert a bone drill and push it obliquely

upward and backward, so as to make it come out near the centre of the cut end of the femur. If I use the nail I drive it through the drilled hole, and then drive it into the lower end of the femur quite firmly leaving the nail-head projecting about half an inch; I drive the screw through the drilled hole of the tibia and then into the lower end of the femur with an instrument made for the purpose, the exposed end of the screw being rectangular. The galvanized wire-nail about one-sixteenth or one-eighth of an inch in diameter and from three to six inches in length answers a good purpose. I have had screws made of nearly the same dimensions as the wire-nails just described; the threads must be of large size in order to hold well.

A drainage tube is inserted in the following manner: It is carried in front of the line of junction of the cut surfaces of the ends of the tibia and the femur; the soft parts posterior to the flap are punctured on both sides of the limb with a bistoury, and the ends of the drainage tube are drawn through the openings; in this way the drainage tube does not interfere with the primary union of the flaps. Interrupted sutures are now put in to bring the flaps together. The parts are covered with antiseptic dressings which are kept on by means of bandages, and the entire limb is put upon a double-inclined plane constructed as follows:

Two pieces of board, one for the leg and one for the thigh, are firmly joined together, end to end, at an angle of about  $160^{\circ}$ , so as to support the limb slightly flexed where the knee has been exsected. The upper end of the thigh piece is beveled so as to prevent undue pressure upon the skin. A foot-piece is fastened to the lower end of the leg piece so as to bring the foot up to nearly a right angle. A piece of wire-cloth is fastened to each piece of the splint, so as to support both the leg and the thigh, the wire-cloth being bent up by the sides of the limb. Suitable pads are put under the thigh and the leg in such a way as to prevent undue pressure on the popliteal space. The foot is supported by the foot-piece, there being sufficient padding under it. The angle made by the bones after exsection and the angle of the splint are made to correspond as nearly as possible. It is necessary to pad the leg so as to prevent harmful pressure on the heel. In fine, a bandage secures the entire limb upon the



splint, and weights upon a cross-bar at the lower end of the splint keep the limb from getting out of place.

The principles and results above enunciated may be illustrated briefly by the essential points in a few cases, as follows :

*Case I.*—H. O'N., a girl, age fourteen years, was admitted to the College Hospital April 24, 1886, having ankylosis of the right knee, the leg being flexed to nearly a right angle with the thigh. She was trying to wear a high shoe, but was very much crippled, and had to be taken care of by her mother. I exsected the knee, removing about four inches of the femur and a thin slice of the tibia. The contraction of the popliteal structures and the hamstring muscles made it impossible to straighten the limb until a considerable portion of the lower end of the femur was removed. In about two months she had firm bony union of the femur and the tibia. She slowly got up and went about with crutches, leaving the hospital October 26, 1886. In two months she obtained employment and supported herself, and the next year she was able to support her mother. Some friends obtained a shoe for this girl, the shoe was four inches in height, but she could not wear it. She found that a shoe with a two inch heel sole was everything she required to enable her to walk without much limp.

*Case II.*—William Y., age fourteen years, was admitted to the College Hospital April 29, 1886, with a "dry" arthritis of the right knee, accompanied by the three displacements, outward rotary, backward lateral, and backward angular. The bending of the knee was slowly increasing, causing disability, which was augmented by the pain. I exsected the knee, and a good result followed. The patient was discharged from the hospital May 29, 1886. He walks nearly as well as any one in normal condition. His general health is excellent. He is in active business.

*Case III.*—E. L. S., a girl, age nine years, had a white swelling of the right knee, ending in suppuration and the formation of sinuses of the articular structures. She was so much reduced in health that the exsection of the knee, or the anæsthesia, or both of these influences, came near being fatal; it was with great difficulty that she was restored after the operation. At the time of the operation it was impossible to remove all of the affected tissue. She recovered somewhat slowly, the bones united, the local infection disappeared; the general health became much improved. The patient was discharged from the hospital March 17, 1887, in excellent condition. The

following summer she went into the country, and played with other children of her own age. After six years she is in excellent health, and can walk and run successfully. Her limb is better than any artificial limb that was ever made.

*Case IV.*—A girl, C. D., age five years, was admitted to the College Hospital November 11, 1886, for white swelling of the right knee; she was in a low state of health at the time. I treated her with plaster-splint on the limb, and with internal remedies until January 5, 1887. Then I exsected the diseased knee, and dressed the parts in the way above described. The local condition went on very favorably, repair taking place in the soft and the bony structures with but very little disturbance. The general condition of the patient was all that could be desired until the 20th of January, when an acute capillary bronchitis developed. Death followed the next day. This case was very promising until the development of the acute bronchitis.

*Case V.*—A boy, age six years, whose mother, as well as his brothers and sisters, except one, had all died of tuberculosis, came to the College Hospital with a traumatic abscess of the lower part of his left thigh, involving the knee-joint and the lower part of the femur. The pathological conditions were those of severe white swelling. After exsection of the knee-joint the patient improved for a time, and then did not do well. At the end of ten weeks the disease returned locally, and the patient began to emaciate. I then amputated the thigh just above the middle. In a few days the soft parts of the stump became very much infiltrated, appearing much like a large white swelling. As the little patient was wasting from day to day, and as the ordinary treatment did not seem to do any good, I changed it for the use of three grains of precipitated carbonate of lime three times a day in milk. In a short time he began to improve, and at the end of four months he was quite well, and left the hospital in very much improved health. He continued to improve for several months, when I lost sight of him, and have not seen him since.

*Case VI.*—A boy, age twelve years, was admitted to the College Hospital with a fracture near the middle of the right femur. The knee on the same side had a considerable white swelling, the leg being bent about twenty-five degrees and quite firmly ankylosed. The disease of the knee was still in progress. After the fragments of the thigh had united I exsected the knee, and obtained an excellent result, the boy's walk being greatly improved. His general health was

much better subsequently. After about two years, October, 1890, he came back to the hospital with tubercular caries of the bone at the seat of the union of the femur and the tibia. He then received injections of Koch's lymph. Soon after this many of the surface glands became enlarged, and the local ulceration was more active. He was taken from the hospital, and I have not seen him since.

*Case VII.*—C. F., a girl, age nineteen years, was admitted to the College Hospital, with an enlargement of the right knee, like "white swelling." June 15, 1891, a few weeks after admission, I exsected the knee, and the disease at that time presented some of the appearances of sarcoma. The case seemed to make a rapid recovery, going on well for about five or six weeks, when proliferation of the tissues at the seat of operation began to show itself. The conditions were soon of a serious nature. In August I amputated the thigh at the junction of the middle and the upper thirds. After this time she was treated with the bromide of arsenic. The stump healed in a few weeks, and the patient was discharged from the hospital on the twentieth of October in good condition; since that time this patient died, but I have not been able to learn the particulars.

*Case VIII.*—R. A., a boy, age six years, was admitted to the College Hospital October 19, 1891, with "white swelling" of the right knee. The year previous I exsected the right hip for morbus coxæ, and there was a good recovery from the local disease. In a few days after the patient came into the hospital I exsected the right knee, and found the soft parts and the bones extensively involved; in no other case have I removed so much of the tibia as in this one. It would have been wise to amputate at once, but the parents would not consent to this operation. The cut ends of the bones were quite soft, yet they held the nail firmly enough to prevent displacement. The case did well for two or three weeks; then it did badly, and I urged amputation, but could not get the consent of the parents; in time the patient slowly improved, but the ends of the bones absorbed more or less and permitted considerable displacement to take place. At the present time, April, 1892, this patient is doing quite well; but it is not possible to say what will be the result.

## EDITORIAL ARTICLES.

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### WOELFLER ON THE SURGICAL TREATMENT OF GOITRE.<sup>1</sup>

The author, who dedicates his work to his former teacher, Prof. Billroth, whose assistant he was for many years, states in his preface that the study of this subject has occupied him for the last ten years of his life, and that many will, perhaps, find it to contain superfluous matter; but he did not intend only to consider the views held to-day in regard to the different methods of operation, but endeavored to analyze and study them historically, and, occasionally also, to test their anatomical justification. The treatment of malignant neoplasms of and inflammatory processes in the substance of the thyroid gland and within the goitre were not considered in this work.

I. The methods of treatment of solid goitre may be divided into (a) those which are only expected to remove or ameliorate the symptoms caused by the goitre, and into (b) those which have for their object to either reduce the size of or nearly entirely remove the tumor.

#### A. SYMPTOMATIC OR PALLIATIVE TREATMENT OF GOITRE.

Although this method of treatment is to-day less in favor than in former years, it can, in certain cases, not be done away with entirely, especially where removal or decrease in the disturbances which are produced by compression of the trachea or œsophagus is desired. The symptoms which are caused by nervous or angiotic disturbances are amenable to symptomatic internal treatment only.

A number of procedures were adopted to relieve tracheal stenosis, of which some are now of only historical interest. Among these latter are: (a) *the severing of the sterno-cleidomastoid muscle*. This procedure is now never practiced, and is, also anatomically, not justifiable; (b) *incision through the skin, the cervical fascia and the sterno-hyoid and*

<sup>1</sup>On the Surgical Treatment of Goitre. By Prof. Woelfler, of Graz. Monograph. 8vo, pp. 283. Berlin: A. Hirschwald, 1891.

*sterno-thyroid muscles.* This procedure has a greater anatomical justification, as these structures are attached to fixed points—hyoid bone, lower jaw, sternum. They can, therefore, not give way, and offer considerable resistance to the growth of the goitre. One who has performed many operations for goitre will certainly remind himself of instances where the goitre, after incision of its coverings, bulged forth like a cushion, and respiration became at once easier. These phenomena are absent if the goitre is partially retro-sternal. From a clinical point of view this operation, which must never be performed subcutaneously, as was done in earlier years, is only justifiable if there be immediate danger of life. A success is only to be expected if we find anterior compression of the trachea; while no relief is to be hoped for in lateral compression. This measure is to be looked upon as a palliative tracheotomy, to be followed after recovery of the patient by a radical operation.

A special position we must take towards the method recommended by Bonnet: *Isolation of the retro-sternal goitre from the aperture of the thorax and simultaneous cauterization of it, in order to fixate the tumor.* The details of the procedure were: The goitre was lifted; it was transfixed by several needles, a fork or troicart (Terrillon's); then the skin situated over the goitre was cauterized with a paste of chloride of zinc to produce sufficient adhesions. We cannot accept the procedure in this form, for cauterization is antiquated and must be rejected. If a goitre can be lifted as far up as above the aperture of the thorax, and this causes relief of the respiratory disturbances, then it may just as well be extirpated. But the importance of this method of dislocation should not entirely be overlooked in the removal of the immediate danger of suffocation. Observation teaches that nature often relieves the patients of the danger of suffocation in this way; *i. e.* by dislocation of the tumor.

<sup>1</sup>Tracheotomy is the only method by means of which we are able to save, to some degree, a patient from the death due to suffocation. It is indicated where the danger is immediate and the performance

<sup>1</sup>The author gives now a historical review of the above described methods, quoting cases of Dupuytren, Bonnet (1831), Liston (1839), Bouchacourt, Bach, Demme (father and son), Gosslién, Billroth, Stadelmann, Sédillot, Schuh, Cusak, Gross, Reverdin, Terrillon and Ollier.

of another radical operation impossible. If a diagnosis of cystic goitre cannot always be made with certainty it will be advisable to precede *tracheotomy*, in doubtful cases, always by exploratory puncture. If fluid be thus evacuated, then, of course, puncture of the cyst will take the place of tracheotomy.

The author considers at length the technique of tracheotomy in the different forms of goitre, and states that it often is very difficult to find the trachea on account of the great degree of dislocation. The best way is to find the larynx, and then follow along it down until the trachea is felt. Long canula must be kept ready and introduced, as the short ones produce ulcerations on the anterior and posterior walls of the trachea. Koenig's and Salzer's canulas are mentioned. After all obstacles are overcome many dangers are still pending over the patient, especially in those cases where tracheal stenosis has existed for some time and where the patients were already cyanotic or unconscious. Some do not recover even after a liberal amount of oxygen is supplied; they have *unlearned* the act of breathing; the centre of respiration has, probably, become already paralyzed. Some do recover, but have a few hours later renewed attacks of suffocation, which, finally, end fatally. Old people very often die from a complicating pneumonitis.

Tracheotomy is, in most cases, resorted to too late. The author advises, therefore, the general practitioner, if he is not in a position to perform radical extirpation, never to put off tracheotomy, the best palliative, till the last minute, even at the risk of being later reproached by the relatives of the patient, that tracheotomy was not yet indicated or superfluous. Tracheotomy should not immediately be followed by extirpation, and vice versa. W. gives now a table showing the prognosis and value of tracheotomy performed in severe cyanosis in benign goitre. The death-rate is not small, which is due to the delay. Only if tracheotomy is performed immediately after the first or the first few consecutive attacks of suffocation will it save more people from the so-called "goitre-death." (Kropftod.)

An historic review of this method follows. S. Sharp (1751) was, according to Hedermis, the first who performed tracheotomy in goitre.



B. METHODS FOR THE REDUCTION OF THE SIZE OR ENTIRE REMOVAL OF THE GOITRE.

*I. Internal Treatment of Goitre.*—The author first mentions the prophylactic measures, viz., removal of the patient from a locality where goitre is endemic, avoidance of drinking water which is known to come from the "goitre-spring," (Kropfquelle) etc., etc.; but he does not care to consider these *in extenso* in his work, as they do not belong to the *surgical treatment* of goitre. W. speaks of the enthusiasm which accompanied the internal treatment of goitre by iodine and which method has now nearly become obsolete. He says, "This again offers evidence of how often the enthusiasm in medical therapeutics resembles a fire of straw, which burns out as quickly as it originated, leaving nothing behind but the ashes of remembrance." Iodide of potash is even to-day used by some, but W. could not find any modern work where it was used abundantly by the author or had led to many very satisfactory results. The employment of the latter is only a sporadic one, and justly reserved for those cases where a certain result can be expected, viz., in the angiomatous goitres (Billroth and Luecke). He recommends great care in the use of iodine on account of the danger of chronic iodine intoxication, iodine-marasmus. Its use is contraindicated in neurasthenic and tuberculous subjects. Small doses should be given to begin with, and these discontinued if they prove harmful or produce no apparent local result after two or three weeks' trial.

Important observations in regard to the action of and complications produced by iodine in the treatment of goitre were made by Lebert (*Die Krankheiten der Schilddrüse und ihre Behandlung*; Breslan 1863) and Deininger (*Ueber die Nachtheile der Jodbehandlung des Kropfes*; Baye aerztlich, Intelligenzblatt, No. 26, 1875). Quinine deserves mention as a specific in those cases of goitre where the latter seems to be connected with malaria. Woakes has had better results from the use of fluoric acid ( $\frac{1}{2}$  per cent. sol.) than from iodine.

*II. The Local Application of Remedies—Iodine and Mercury.*—Already in 1822 was potass. hydroid salve used successfully in the treatment of goitre by Coindet. Luecke advised to add a few drops

of the tincture of iodine, as potass. iod. salve becomes only active after it has turned yellow, i. e., when it has become decomposed. The iodine salve, in this form is harmless and certainly less irritating than the tincture of iodine. Its use will prove especially efficacious in cases of recent origin, but it must be continued regularly for several weeks. More recently Gussenbauer (Prague) has warmly recommended iodoform salve (1:15). He applies over the strips of linen, which serve the salve as a basis, warm compresses of Burow's solution. This manner of treatment gave good results in hypertrophic conditions of the thyroid gland of recent origin and in young persons. In goitres of long duration and older persons its efficacy is less certain. Boechat used with satisfactory results iodoform glycerine internally and externally. Hill, Frodsham and Mouat use hydrarg. deuteriodat (about 1, 1 grammes to 35 grammes of lard). All iodine containing salves will have a beneficent action in young people and goitres of recent origin (school goitre, epidemic goitre, angiomatous goitre). They will reduce the size of the tumor, but will not prevent recurrence, and have, therefore, only a temporary action.

2. *The local treatment of goitre by means of cold, blood-letting, massage, compression, by the galvanic current or electrolysis.* *Application of cold*; although cold applications, to bring about anæmia and subsequent shrinkage of the goitre, seem to have been used for some time, yet the author thinks that M. Schmid was the first (1883) who has used this means methodically as a remedy for the cure of goitre. He, however, used at the same time potass. iod. internally, and, therefore, it is not quite clear to what particular measure the very satisfactory results which were also noted by Fraenkel (1888) are to be ascribed. In order to estimate the value of cold, *per se*, W. experimented with it in the surgical clinic, at Graz for a year and a half in a number of cases. His conclusions are: the action of protracted application of cold is in many cases an excellent remedy to diminish the size of the goitre and to remove entirely, or nearly so, all disturbances connected with it. This measure is especially efficacious in cases of angiomatous goitre, in the often acute enlargements of the thyroid gland in young persons. The grave phenomena of tracheal stenosis often disappear in one to two days, and in this respect the

*constant use of cold may substitute tracheotomy.* Leiter's tube-apparatus was used. W. quotes cases of young individuals where the use of cold alone caused a disappearance of goitres of a temporary nature. Whether the tumor reappears after some time, he is not prepared to answer. W. ascribes, therefore, to cold, in the therapy of goitre, not only a symptomatic importance, but in some cases it even proves to be a radical remedy.

The author does not think much of the use of *leeches*. They may, however, under certain circumstances come into consideration, where the other means cannot be tried and tracheotomy (in asphyxia) cannot be immediately performed; in congenital or angiomatous goitres.

Entirely to be rejected is *venesection* (cervical veins, according to Hedenn's). *Massage* of the goitre promises only temporary and slight results. In acute enlargement we have better remedies at our disposal, and in those cases where the enlargement is slow we possess methods which have stood the test better and longer.

*Compression* of the goitre may receive mention here, but a consideration of its pros and cons, the author thinks unnecessary, as the uselessness and torture of this procedure is apparent.

*Galvanization and Electrolysis* of the goitre do not find many warm advocates nowadays, simply because the procedure is tedious and the result is uncertain and slight. Some authors (Chostek, 1871, Morell Mackenzie, Ruttner and others) claim good results. As regards a definite decision other and more observations are necessary.

3. *Parenchymatous Injections*; these were, no doubt, pushed into the background by the favorable results of operations. There were and are still many who warmly recommend to try a few parenchymatous injection before operation is resorted to. The author, reminding himself of the many disagreeable occurrences and even sudden deaths connected with this procedure, hesitates to use or recommend it. \* The advantages of this method were often and exhaustively treated of and are well known. He refers to the interesting and highly instructive chapter on this subject in Billroth's

Annual Reports (1860-1870, pp. 207-213) for further information. Billroth, Luecke, Schoalbe, Terillon and Sebiteau reported very good results. Only certain kinds of goitre will be amenable to this form of treatment. Fœtal adenomata, in the stage of development, and the hæmorrhagic form of goitre with its products of transformation (necrobiosis, fibrous degeneration and calcification) cannot be subjected to this method of treatment. It is an error, maintained by some, that the tincture of iodine is inactive in adenoma gelatinosum. Its activity was proven by Billroth (1876), by Störk and the author (1877—by experiments on dogs). In order to be successful with this procedure the cases must be carefully individualized. The author gives comparative tables of cases from the clinic of Prof. Billroth (Vienna) treated by injections with tinct. iod. (25 cases), and injections with hyperosmic acid (3 cases), and injections with ergotine (Vienna policlinic; 5 cases). The tables show that the injections of tinct. iod. yield as many good results as disappointments. The treatment is most efficacious in angiomatous goitre, and in young persons at the period of puberty. In spite of these good results the author warns with emphasis of the danger connected with the intra-parenchymatous injection of tinct. iod. There are many cases of death on record following the injection of tinct. iod., caused by embolism, paralysis of the glottis, acute iodine-intoxication and iodine-marasmus; one must be careful to find out, on laryngoscopic examination, whether there is not, by accident, a tumor present, which obstructs lumen of the larynx or trachea. If this should be the case, intra-parenchymatous injection should not be practiced. It is, therefore, perfectly appreciated that, recognizing in general the value of intra-parenchymatous injection, endeavors were made to substitute the tinct. iod. by another remedy. Billroth tried Fowler's solution, but without result. Schwalbe recommended alcohol, asserting that the latter was the active principle in the tincture of iodine. Billroth and Lœcke, who tried the latter had each a case of death following its use. Many other substances were tried (osmic acid, ergot, permangan. of potass., chromic acid, strychnine, etc.); but the results were either uncertain or accompanied by dangerous complications. W. himself had some good results with hyperosmic acid.

Better and more encouraging results are yielded by the employment of intra-parenchymatous injection of iodoform. Von Mosetig (Vienna) has pursued this course of treatment for the last ten years. His method and conclusions are: R. Iodoformi 1, 00; tethenis 5, 00; bl. oliv. 1, 00; or R. Iodoformi 1, 00; tethenis, ob. oliv. aa 7, 00. This mixture should always be of light yellow color and transparent; as soon as it assumes a brown color it is an indication that the iodine has been liberated and decomposition has taken place. The method of injection is the same as in the use of iodine injections. Five to ten injections are made. Von Mosetig has used this treatment in 79 cases. He had never noted disagreeable side-action; and the effect was in some cases an "ideal one," and in all quite satisfactory. Mosetig's statements were corroborated by L. Frey. The circumference of the neck is decreased from 2 to 4 centimetres. The author himself had good results with this method in three cases. He thinks that this preparation of iodoform will not only substitute but supplant the tincture of iodine.

*En résumé*, the author says that intra-parenchymatous injections constitute a very good and efficient treatment where a diminution of the tumor is desirable and where we cannot or dare not risk operative interference.

*III. The Destruction of Goitre by Cauterization* (caustics, actual cautery and galvano-cautery).—In regard to this the writer says: "The insignificant value of the dangers connected with this method make it superfluous to consider it at length. As the destruction of the goitre-tissue by means of caustics or actual cautery will not be done in future, at least not in the manner in which it was practiced in earlier times, it will suffice if I only give a historical review of this method."

The author, however, advocates ignipuncture with fine needles of the substance of the goitre, in cases where, on account of the very large size, no injections or operations can be performed, and by it to cause destruction of the tumor, as is done in the case of a *tumor cavernosus*. He intends to try this method at his earliest opportunity.

*IV. Use of the Seton*.—This antiquated procedure is dangerous and cruel. It only could be adopted at a time when the knowledge

of the anatomy of goitre was very primitive. The reason why it was for quite a long time used and recommended by French surgeons at the beginning of this century was that it yielded by accident, without their knowing it, good results in cystic goitre. This procedure is now condemned by all authorities, and needs, therefore, no further consideration.

*V. Ligature of the Goitre; without simultaneous extirpation.*—

This method served mostly to produce gangrene of the goitre, and must, therefore, be classed among the methods which aimed at a destruction of the goitre-tissue. Ligature of the goitre without simultaneous extirpation of the same is, according to our modern views, such a doubtful procedure that it is well nigh unnecessary to emphasize especially the fact that by leaving the gangrenescent tumor we retain in the wound everything which tends to produce sepsis and pyæmia or to cause secondary hemorrhage. This method was, on account of the just stated disadvantages, not frequently practiced. Rulandus is the first who describes it (thirteenth century). The method was recently modified by the use of the elastic ligature. The different methods of ligature, as regards their technique, may be divided: 1. Ligature of the goitre, including the skin (Rulandus, L. Heister, about 1766); 2. Ligature after incision of the skin at the place of the ligature (Malgaigne); 3. Ligature after incision of the skin and exposure of the tumor (Purmann, 1716; Mayor, 1826); 4. Subcutaneous ligature (M. Rigal, 1841).

*VI. Amputation of the Goitre.*—By amputation of the goitre we understand that procedure by which the accessible and anterior portions of the tumor are removed. This, however, is done rarely in the case of solid goitres and without preceding protective measures, and was only performed by inexperienced and fool-hardy surgeons of earlier centuries; of course, fatal hemorrhage was the result. This method was later (Aurman) modified by the ligature of the pedicle previous to amputation. The *écraseur*, galvano-cautery and thermo-cautery were, later on, used. The large wound surface caused by these, and the removal of the anterior part of the tumor only, which was erroneously supposed to be the cause of the tracheal stenosis, —while the other portions of the tumor, which more frequently give



rise to the tracheal stenosis, are left unaffected,—render this method impractical. In the interest of our science it is to be expected that this procedure will find no imitators, even with our modern improvements. This operation is not justifiable from an anatomical as well as surgical standpoint.

*VII. Evidement (Evacuatio Strumæ) (Kocher).*—This method was already recommended by Purmann, but it was methodically performed by Kocher (1872–1874). “I shall readily admit,” says Woelfler, “that evacuation of the goitre-tissue may be the *last* resort, when we can do nothing else, as we have often to take refuge to *morcellement* in other tumors, if they are very much adherent to the neighboring parts, and can neither be enucleated nor separated; but I can never call this a favorable and good auxiliary measure. It should, also, not be elevated to the rank of ‘a method.’ I have seen nothing good come from it. Billroth tried it in one case, which ended fatally.”

*VIII. Artificially Produced Atrophy of the Goitre by Ligation of the Afferent Arteries.*—“The ligation of the thyroid arteries is certainly an invaluable and interesting addition to the operative treatment of common goitre.” (Billroth, on the ligation of the thyroid arteries for the induction of atrophy of goitres. April 5, 1888.)

*1. Indications for this method.*—(1.) In all very vascular goitres (V. Walther, Billroth, Kocher); in all goitres which have large arteries or numerous veins and capillaries; in all which are easily compressible; perhaps, also, in morbus Basedowii (Kocher.) (2.) In the hypertrophic forms of goitre (Rydygier); especially if the development was quick and the enlargement presents an equal diffusion; perhaps, also, in quickly developed gelatinous goitres. (3.) Exceptionally, also, in other forms of goitre, where tracheal stenosis is present and the danger is increased by extirpation, on account of the paralysis of the vocal cords, or if extirpation, dependent on other reasons, is not advisable, especially if older people are in question. (4.) The method is contraindicated in malignant goitre, cystic goitre, cysto-adenoma gelatinosum, as well as in fibrous and calcified goitre. (Billroth, Rydygier.)

2. *What results can we expect from the use of this method?*—The cosmetic effect will be slight, yet the neck will not look as emaciated and ugly as it does after extensive extirpation. What we must expect is a considerable decrease of the phenomena of obstructed respiration, after a few days, and no recurrence of the same. If this does not take place after a few days then this method has not yielded what it ought to. It is, however, significant for this method that splendid results are opposed by utter failures. In these latter there exist, perhaps, more than the four ligated arteries, or circulation is by some anatomical reason rapidly re-established in the goitre. The risk of producing by this method gangrene of the goitre has been shown by experience not to exist.

3. *Technique of this operation.*—Before we enter upon the performance of the operation it will be well to see whether we can discover a large pulsating vessel—the innominate artery—in the median line of the anterior portion of the neck, below the isthmus, between the latter and the sternum. This vessel being well covered and deeply situated, it will, moreover, be advisable to look for it also, later, after the incision for finding the inferior fibroid artery has been made, if the latter is found to be of a calibre equal to that of a common round match, or should not be detected at all. It is not advisable to ligate the two vessels of one side only, although there does not exist a capillary communication between the vessels of the two sides, as demonstrated by Hyrtl and Jaeger-Luroth. If the vessels of one side are only ligated recurrence easily takes place (Billroth, Rydygier). The operation should also be performed simultaneously on both sides. The author states the following in regard to the anatomy, and gives the following landmarks for detecting the super-thyroid artery: (a) the cornu of the hyoid bone, in which neighborhood the arch of the artery lies; (b) the external margin of the orno-hyoid muscle, which muscle is always to be drawn towards the centre; (c) the internal margin of sternocleido-mastoid, along which the incision is to be made. More difficulties are encountered with the ligation of the inferior thyroid artery; (c) J. M. Langenbeck gives a very accurate description of the procedure (Nosologie and Therapie der Chirurg. Krankheiten; V. Bd. I. Abth.; Goettingen 1834). Drobnick leaves

the choice of the place of ligation with the individual surgeon. The author thinks that the most favorable point is about a half an inch below the bending of the vertical part of the vessel into the horizontal, for the following reasons: 1. The point where the truncus thyroid cervicalis takes its origin from the subclavian is so uncomfortably deeply situated that one has to look down into a dark funnel, and if it should happen that a vessel should begin to bleed at the deepest point of this funnel one cannot think of an exact and ready control of the hemorrhage. 2. The nearer one gets to the origin of the trunk of the subclavian artery the more difficult becomes the finding of the inferior thyroid artery, as the drawing aside of the sternocleidomastoid is less easily accomplished in its lower portions, and also the drawing aside of the carotid where it joins the subclavian is a very risky undertaking (it happened, in such a case, to the author, that the carotid was torn off at this angle; a very severe hemorrhage and other disagreeable consequences were the result). The cutaneous incision should not be made between the heads of the sternocleidomastoid (recommended by Langenbeck), but along the exterior border of this muscle (experience of Drobnick, Billroth, Rydygier and Woelfler). The usual incisions were a vertical one, corresponding to the exterior border of the sternocleidomastoid, and another to the external border of the goitre itself. This method leaves, however, two large long scars on the neck, and Rydygier therefore recommended, on account of cosmetic reasons, a vertical incision 2 cm. above the clavicle. But with this there is danger of coming into conflict with the subclavian artery. The author, therefore, recommends a curved incision. Considering the propositions of Drobnick and Rydygier and the experiences of Billroth and those of the author, the following procedure may be well recommended:

1. An arch-like incision at the external border of the sternocleidomastoid; its concavity (of the incision) directed outward, leading towards the fossa supra-clavicularis.
2. Ligation of the superficial veins, exposure of the external border of the sternocleidomastoid; drawing aside of the latter towards the centre.
3. Careful separation of the internal jugular vein, the vagus and carotid, and drawing aside of these structures inward; exceptionally the carotid may be drawn

outward. 4. Search for the scalenus anticus muscle and the phrenic nerve; the latter serving as a landmark. 5. At the internal border of the scalenus anticus, or somewhat towards the centre of the neck from the internal border of this muscle, we shall find the trunk of the inferior thyroid artery, and still more centrally located the vertebral artery, (Vid, Fig. 33, Surgic. treatment of goitre; Part II). The artery is then isolated, caught between two artery forceps) severed in the middle and then ligated; as the author can only join the opinion of Billroth, that the inferior thyroid artery is very friable, and easily torn. The latter condition being probably due to fatty degeneration, caused by the pressure of the goitre (sometimes also the case with the carotid). Before the vessel is cut through it should carefully be surrounded by the ligatures.

*4. Disagreeable phenomena during the operation and course of the wound.*

(A.) The infer. thy. artery may be torn during the act of isolation or ligation, (b). The fibres of the phrenic nerve may be included or pulled, and ill consequences result. The course of the wound was, as far as the author's information goes, always normal and uneventful.

*5. Results in former and recent times.* The results in former times (till 1852) in about thirty-two cases of ligation were:

Five times death.

Five times no or slight improvement, thirteen times a striking improvement, and nine times perfect cure.

Regarding the results in recent times, the author quotes thirty-nine cases (Billroth, Rydygier, Woelfler, etc.,) with mixed results. The writer says: To pass final judgment on the value of this method the number of cases and experience are not sufficient, but they, however, show that, by ligation, usually all subjective symptoms disappear, atrophy or decrease of the size of the tumor is induced, and in some cases not only improvement, but perfect cure took place; that the atrophy was a permanent one was shown in the author's experience, as well as by Rydygier, who subjected his cases to a "revision" after several months.

Will the atrophy be a permanent one? W. quotes here Billroth: "If all four arteries be ligated *yes*; if circulation is re-established, either through one of the principal arteries or through the vasa vasorum, *no*."

IX. *Enucleation of the Goitre-Nodes*.—This procedure was elevated to the rank of a method by Socin; it consists in enucleating the nodes from the parenchyma of the goitre. This procedure was, however, already practiced before Socin by Porta and Billroth. The writer quotes cases of enucleation of the goitre-nodes (Porta, Billroth, Reverdin, Woelfler, O. Bruns, Kocher, Kesar, etc.), with only one case of death. Besides he quotes twelve cases of his own, which all had a favorable issue.

*Technique of enucleation*.—1. The locality and direction of the incision may be left with the choice of the individual surgeon. I (Woelfler), however, prefer, especially with girls, an incision, which extends from one sternocleido-mastoid to the other arc-like around the jugulum, because this cicatrix is most easily covered; 2. The goitre should, before the operation, be carefully palpated as gelatinous nodes, which may simulate solid nodes, are not appropriate for enucleation (Porta, Woelfler). 3. The veins should be avoided and the parenchyma should be incised at a spot where there are no veins; but if the latter cannot be avoided they should be doubly secured by circumtransfixion before the incision is made. 4. If the hemorrhage from the cortical parenchyma be alarming it is advisable to get the tissue before separating it, between hæmostatic forceps, and thus advance slowly, step by step. 5. The enucleation should be done slowly, as quick and hasty separation of the vessels may lead to hemorrhage. 6. If several nodes are to be enucleated, one frequently succeeds in doing it from the capsule of the first enucleated node. 7. After enucleation, especially if other nodes are to be removed, the cavity from which the node has been removed should be filled with compressing material (iodoform or sublimate gauze), and leave it there for a few minutes, to control the hemorrhage, and later the individual vessels should be ligated. 8. If it be necessary compression may in this way be continued till the next day, and the wound then united. It is best to ligate all vessels immediately after the

operation. 9. No open wound should be left on the surface of the goitre; drainage should be provided for. 10. The severed muscles (omohyoid, sterno and thyro-hyoid) should, also, be united.

*Difficulties resulting at the operation, and how to combat them.—*

(A). The most important complication during operation is hemorrhage; it may even prove fatal. The author divides these hemorrhages into (1) that coming from the large vessels, and (2) that originating in the numerous small vessels of the parenchyma. To control it extensive ligation and compression are recommended and described at length. (B). Another difficulty encountered in enucleation consists in that one cannot always make out with certainty the border between the capsule of the gland and surface of the adenoma-node. (C). A third difficulty is often represented by the following state in the goitre: there may exist such a mass of nodules (30 to 40) that they cannot all be removed. If any are left recurrence will surely take place.

The author advises in such cases unilateral radical extirpation of the gland. The entire gland should never be extirpated on account of the danger of induring cachexia thyreopriva.

*Course and Termination.*—In 60 cases (Billroth, Socin, Woelfler), only two deaths occurred. The course of the wound is always satisfactory. As regards recurrence after this operation, nothing very definite can be stated, as the observations are too recent. The author, however, had already opportunity to see one case of recurrence.

*Advantages and Disadvantages of this Operation.*—1. The operative procedure is in the majority of cases slighter than in partial or total extirpation. 2. The more extensive hemorrhage in this operation than in extirpation, is one of the disadvantages; but it is wrong to compare the *complicated* enucleations with *uncomplicated* extirpations. If *complicated* extirpations will be compared with *complicated* enucleations, not much will result in favor of the former. 3. The patients are less affected after enucleation than after extirpation. The course of the wounds, also, offers less complications in enucleation. 4. One can always pass over from enucleation to partial or total extirpation, but not *vice versa*. 5. *Another disadvantage* of this operation is that it



cannot be performed in every case (adenoma gelatinosum), etc. 6. Finally, recurrence is more likely to take place after this operation than after partial extirpation.

A historical review of the enucleation of goitre is added.

ALBERT PICK.

[*To be continued.*]

#### POORE'S CONTRIBUTION TO THE STATISTICS OF OPERATIONS UPON TUBERCULOUS HIP JOINTS.<sup>1</sup>

The author reports sixty-seven cases of tubercular disease of hip-joint occurring in children from three to fifteen years of age, operated upon from 1873 to January 1, 1892, and occurring in hospital practice.

Sixty-five joints were excised ; in five, erosion was performed ; in eight cases the trochanter major was trephined ; and in eleven cases the central cavity of the femur was cleaned out. In all the cases of excision the disease was more or less pronounced, and always accompanied by abscess.

It has been the rule to open all abscesses as soon as discovered, and explore the joint if the disease is marked ; the parts were scraped or excised, and of late all tubercular tissue has been removed as thoroughly as possible.

The joint was entered in fifty-one cases by the old excision over, or behind, the trochanter major and the diseased parts were removed. In the earlier cases the upper part of the femur was thrown out through the wound and the parts divided with a saw. Later, the bone has been divided *in situ* with a sharp osteotome and the head and neck then removed ; the disturbance of the soft parts is much less by the latter method.

In all recent cases the capsule and all infected tissues have been removed as thoroughly as possible, the acetabulum scraped, and carious bone about its rim removed. The parts were then flushed

<sup>1</sup> CHARLES T. POORE, M. D., New York, in the *New York Medical Journal*, April 23, 1892.

with mercuric solutions (1 to 1000), the wound partially closed with deep and superficial sutures, leaving a large opening leading to its deepest portion; this was stuffed with iodoform gauze, and over this the usual bichloride dressing. There is no advantage in closing up entirely the wound, or only leaving a small opening for a drainage-tube. Whenever it has been done suppuration and an accumulation of tubercular tissue of the cavity left by the removal of bone has followed. It is difficult to get away all infected tissue, and a good, free exit for such material is an advantage. Since giving up the use of drainage-tubes and trusting to ample openings and iodoform gauze, wounds have acted better, so that there has been less after-curettling than formerly. A good firm cicatrix results above the truncated shaft which not only binds the femur to the pelvis, but also prevents, to some extent, the riding upward of the shaft when any weight is borne by the limb.

In fifteen cases access was gained to the joints by an anterior incision made "on the outer side of the crural nerve, a little below and half an inch internal to the anterior spine of the ilium, and passing vertically downward four or five inches. The internal border of the sartorius is first exposed, then the rectus, outer border of the ilio-psoas muscle," or the incision may be made from the outer side and just above the anterior superior spine of the ilium downward on to the capsule of the joint. The latter incision gives more room. The advantages of this incision are many: it readily exposes the joint without much disturbance of the soft parts: it gives a better view of the capsule, bone and surrounding tissues. The joint can be cleaned out more readily than by the lateral incision, and it is the only method by which an erosion can be done without great displacement of the head and neck. This incision was adopted in all cases except those in which there were extensive sinuses behind and below the hip, or where there was reason to expect profound changes in the articulation. If, after gaining access to the joint by this method, a lateral incision is demanded, it can be made without any disadvantage to the patient. Thorough curetting and flushing out with hot water, with partial closing of the wound and stuffing the rest with iodoform gauze, prevents any accumulation of matter.

In many old-standing cases a comparatively clean operation is an impossibility, and suppuration, often profuse, must be expected, and in this class the advantage of a large drainage opening is great as affording ample room for the escape of pus and infective material.

The after-treatment is as follows: As soon as the patient is returned to bed, extension and a long splint extending from the axilla to the middle of the leg is applied, so as to keep the limb at absolute rest, and these are kept on until the wound has closed, the packing being removed and reapplied as often as required. Considerable oozing and bloody serum will saturate the dressings for a day after the operation, but after that, if the case goes on well, the discharge is slight. If at any time tubercular granulations make their appearance the patient should be placed under ether and the parts thoroughly curetted, any suspicious point being removed, either in the bone or soft parts.

If there are abscesses in the soft parts about the diseased joint their cavities should be thoroughly curetted and drained independently of the joint cavity if possible.

In sixty-four cases only one joint was involved, and in three both.

The head and neck were removed in thirty-six cases, and in twenty-four the section was made below the trochanter major. The head alone was removed in seven cases.

There were extensive bone lesions in thirty-six cases, while in the remainder the disease was limited to the head alone.

The condition of the parts removed varied from extensive infiltration and softening of the bone, with perforation of the acetabulum, to simple caries of the head or tubercular abscesses.

In fifteen cases loose bone was found in the cavity of the acetabulum, and in seven the head of the femur was attached. In five of the latter cases the operation consisted only in the removal of the loose head and curetting the cavity. In four cases there was pathological dislocation of the head of the bone, or what remained of it, on to the dorsum of the ilium, and in three of these the end of the femur was ankylosed in this position, dead bone being imprisoned by the new tissue forming the bond of union between the shaft and the pelvis.

In eleven cases the acetabulum was perforated, and in nine intra-pelvic abscess was present. In one case the gut and bladder were perforated by the abscess; in one only the gut, at what point could not be made out, but it was probably low down, as in one well-formed faeces passed out through the wound, while in the other water passed from the perforated acetabulum out through the anus.

Secondary abscesses formed in quite a number of cases, especially those in which the wound had been closed by sutures and drainage-tubes used.

In ten cases the end of the bone had to be re-excised after some time, and in thirty-five cases old sinuses curetted on account of the appearance of tubercular granulations.

Simple erosion was performed in five cases. Of these only two persons recovered without a regular excision, the remaining three coming to that operation.

The ultimate result in sixty-six cases is as follows. By cure is meant that all sinuses have closed and there is no symptom of trouble about the hip; by relieved that sinuses are open:

There were thirty-two children discharged *cured*, twenty-five died, three discharged relieved, two discharged not improved, and four in the hospital.

Of those discharged relieved, in one the ultimate result is unknown, one died with causes not connected with the joint, and one, when last heard from, was evidently affected with amyloid degeneration.

Of those discharged not improved, one died shortly after leaving the hospital, and in one the result is unknown.

Of the cause of death, fourteen died from amyloid degeneration, one from amyloid degeneration and peritonitis, two from general tuberculosis, one from acute nephritis, one from septicæmia, one from heart failure, one from coma (uræmic), three from meningitis and one from exhaustion.

In three of the fatal cases the wound was soundly healed and the children had the use of the limb some time before their death.

In one case the knee joint on the opposite limb had to be amputated on account of advanced disease of that articulation. The time

that elapsed from the time of operation to the date of death varied from one day (the case of heart failure) to five years, the average being seventeen and a half months.

Of the cases of perforation of the acetabulum, seven patients died and four recovered.

Of the two patients with perforation of the gut, one died from heart failure soon after the operation; the other recovered and has had no further trouble. He has been out of the hospital for three years, and is well.

*Ultimate Results.*—A factor that contributes much to the difficulty in walking is the riding upward of the end of the femur upon the pelvis when any weight is borne upon the limb. This riding upward is due to the loose connection of the end of the femur with the pelvis. It sometimes amounts to more than the actual shortening, as measured from the anterior, superior spine of the ilium to the malleolus, but it varies much in different cases. If only the head of the bone has been removed, the neck, unless it has been pulled away by too heavy an extension weight, will be confined in the cavity of the acetabulum by new connective tissue, and no riding upward can take place. On the other hand, if all the neck has been removed, and, further, if section has been made between the trochanters, there is nothing to prevent this displacement every time weight is thrown upon the limb but the amount and condition of cicatricial tissue around and above the end of the bone. For this reason the more of this kind of a buttress there is formed above the point of section, and the more compact it is, the more useful will the limb be. Therefore no attempt should be made to obtain immediate closure of the whole wound. Another practical point is not to keep the end of the bone away from the line of the acetabulum by too powerful extension, or the cicatricial tissue formed will afford too lax a bond of union between the end of the bone and the pelvis, and a flail-like joint will be the result. A strong hip splint should be worn for at least one year after a cure, in order to prevent the new-formed tissue from being elongated.

Of the patients discharged cured, the present condition of twenty-three is absolutely known: One is well eighteen years after discharge; one is well eleven years after discharge; two are well nine years after

discharge; one is well seven years after discharge; two are well six years after discharge; one is well five years after discharge; one is well four years after discharge; one is well three years after discharge; four are well two years after discharge; nine are well one year after discharge.

The amount of shortening in some of these cases has increased, while in others there has been but little, if any, change. One patient at the time of discharge had one inch shortening; in eight years it has increased to two inches and a half; one patient at time of discharge had an inch and a quarter shortening, in eighteen months it was an inch and three quarters; one patient at time of discharge had an inch and a half shortening, at the end of six years there was two inches and half; one at time of discharge had an inch and a half, and at the end of one year an inch and a half; one at time of discharge had an inch shortening, at the end of five years had an inch and a half; one at time of discharge had an inch shortening, at the end of two years had an inch and a half; one at time of discharge had an inch shortening, at the end of eighteen months had an inch; one at time of discharge had three quarters of an inch shortening, at the end of three years had an inch and a half; one at time of discharge had four inches shortening, at the end of fourteen years had seven inches shortening.

In the patient who had four inches shortening at the time of discharge at least half was due to atrophy of the limb and arrest of growth. He now has seven inches shortening. For a time he wore a high shoe and would get along with but little difficulty, but he has discarded its use, and now goes about with the aid of a crutch. He is able to bear his weight on the limb and has considerable power over it.

The usefulness of a limb after excision of the hip-joint depends chiefly upon the strength and firmness of the attachment of the end of the femur to the pelvis; the shortening, provided it is compensated for by a proper high shoe, is not the main impediment to easy walking.

There is always some limp, a sinking down of the side of the body on which the operation has been performed, due often to the insta-



bility of the support. Notwithstanding this, most of them are able to get about without discomfort. In some cases there is no riding upward of the shaft, while in others it is the chief cause of the difficulty in walking. In many cases most of the normal motions of the limb can be performed while the patient is on his back, while in others flexion is difficult. The limb is certainly not so good as one ankylosed at a proper angle. A successful erosion gives as good a limb as after a cure by the expectant method of treatment.

Cases in which the acetabulum is perforated are not hopeless, provided good drainage is afforded, and this can only be obtained by an excision, the section being made below the trochanter major, no matter what may be the condition of the head. The presence of amyloid degeneration is not a contra-indication to excision, but rather an indication for it, provided the soft parts are not completely riddled with abscesses and the bones profoundly diseased; in such a case an amputation affords the best chance for saving life. Disease of the pelvic bones is of grave import, and these cases usually terminate fatally in my experience.

Trephining the neck of the femur through the trochanter major was performed upon eight children. The indications are symptoms pointing to disease beginning in the bone, such as painful spasm and night cries, the articulation itself not being involved.

The operation is easily performed by making an incision over the trochanter major, and then applying a three-eighth-of-an-inch trephine, so as to perforate the center of the neck as far as possible without entering the joint.

This is then flushed out with mercuric solution, a small Volkmann spoon passed in to discover if possible any soft point, then a drainage-tube and iodoform, and, over all, the usual dressing applied.

In four cases diseased bone was found; in the other none. The immediate effect of the operation is always to stop night crying and spasm, and diminish the tenderness about the joint. The ultimate results were as follows: In two there was no return of any disease; the patients made a rapid recovery and have remained well ever since. The six other cases came to an excision, the pain after some weeks returning and the disease following its usual course. In the two

patients discharged cured their histories were such as to leave no doubt as to the nature of the disease—articular osteitis.

*Cleaning out the Central Cavity of the Femur.*—In some cases of joint disease, after the removal of the head and neck, the cut surface of the shaft presents a dark appearance, the bone is soft and infiltrated, the periosteum is thickened and easily detached, so that the whole shaft can be easily forced out through the wound, leaving the periosteum intact. If the medullary cavity of the femur is reached by the section it is found filled with dirty, dark-colored material; the external shell of the bone is thinned, of a dark color, and soft. In cases where this condition exists the upper portion of the wound may do well, but a sinus, often several, will persist, through which the cut end of the femur can be felt more or less eroded and from which the periosteum has retracted. If the wound is opened and a section made farther down the same unhealthy condition will be found, and in a short time the cut end of the femur will present a condition and appearance the same as before. The wound will seldom close, and after a time amyloid degeneration shows itself, followed by a fatal termination. Since 1884 in all such cases an opening was made into the shaft of the femur on its outer aspect just above the knee joint. Exposing the medullary cavity, a long probe, to which is attached a piece of silk thread and to this a long strip of iodoform gauze, is drawn through the whole length of the cavity in the bone, so as to thoroughly remove its contents; it is then flushed out with bichloride solution, iodoform dusted in, a drainage-tube inserted in the lower opening, and the wound in the soft parts closed, except where the drainage-tube protrudes. The result of this operation is that all the diseased tissue is removed from the medullary cavity of the femur, and, unless there are other causes at work, the wounds close and recovery follows.

In twenty-one cases this condition of the shaft of the femur was found; in eleven, the central cavity was cleaned out, and in ten no operation was done; in the ten latter cases, eight patients died and two recovered. Of the eleven patients treated as above described, two died and nine recovered, one of the patients dying from heart failure twenty-four hours after the operation; the other, three years

later, from amyloid degeneration, the femur giving no further trouble. By recovery is meant that the excision wound healed.

In one of the cases of recovery the whole shaft became enlarged but has never given any discomfort.

#### WHITMAN ON RADICAL CURE FOR FLATFOOT.<sup>1</sup>

The affection is easily recognized. Persistent pain, weakness and discomfort about the arch of the foot, increased by standing or walking, particularly in going up or down stairs, with tenderness on pressure at the junction of the astragalus and scaphoid, are the earliest symptoms. In some cases the arch may appear perfectly normal, while in others the foot is entirely flat. Persistent pain in the feet is almost always of local origin, and demands local treatment. In considering the treatment the important question is, Can it be replaced in proper position? If it can—that is, if its movements are free and unembarrassed, not limited by muscular spasm or inflammatory adhesions—the treatment is very simple. An efficient support, a proper shoe, an avoidance of faulty positions, with exercises for strengthening the weakened muscles, will at once relieve the patient. If, however, the reduction of the deformity by manipulation is impossible it should be treated as any other dislocation should be—adhesions should be broken up and the deformity reduced. The patients are usually young adults; the deformity is extreme; the affection rapidly progressing; the patients are almost completely disabled; the symptoms are so urgent that they are very amenable to treatment, and the results are most satisfactory. Excessive muscular spasm and rigidity in a young person I have come to look upon as a very favorable indication, as it shows muscular strength and integrity of bone. A radical cure is possible in all recent cases of flat-foot, and relief of pain and, to a great extent, of deformity may be assured in every case.

The treatment is conducted on the following principles:

1. Forcible reduction and over-correction of the deformity.
2. A temporary support to prevent relapse.

<sup>1</sup>ROYAL T. WHITMAN, M. D., New York, in the *New York Medical Journal*, February 27, 1892.

3. A proper shoe.
4. Manipulation to stretch contracted and shortened tissues.
5. Exercises to strengthen weakened muscles.
6. A re-education of the patient in the proper manner of walking and supporting weights.

Under ether the foot is forcibly moved in all directions to break up adhesions, and is then forced into a position of extreme adduction or equino-varus, and retained there by a well-padded plaster bandage. Although great force is sometimes used, the after-symptoms are usually slight, and the patient, if he desires, is allowed to walk about on the plaster bandages on the following day. In about a week, or earlier, if there is no pain in the feet, the bandages are removed and plaster casts are taken for the support which is to be used.

Casts are easily and quickly made in the following manner: Seat the patient in a chair; in front of him place another chair of equal height; on it lay a thick pad of cotton batting and cover it with a square of cotton cloth. Put about a quart of cold water into a basin with a tablespoonful of salt; sprinkle plaster on the surface, stirring until the mixture is of the consistence of thick cream, then pour it upon the cloth. Flex the patient's knee and allow the outer side of the foot, previously oiled, to sink into the plaster, raising the edges of the cloth until rather more than one half the foot is covered. When this is hard, spread vaseline on its upper surface, and, having mixed a smaller quantity of plaster, cover the exposed surface of the foot; the toes need not be included. When hard, the two halves are removed and their inner surfaces oiled. They are then bandaged to one another and the interior filled with plaster of the same consistence as before. When the outer shell is removed we have a reproduction of the foot ready for further manipulation. This consists in changing the cast with the exercise of a certain amount of judgment, so that it may resemble a perfect foot—that is, to scrape away the projection on the inner side if any remains, and to deepen the inner and outer arches. It is thus possible to still further overcome deformity which could not be corrected by the forcible reposition under ether. When completed, the casts should stand squarely on the table with no in-

clination to either side ; they are then sent to the foundry to be reproduced in iron.

The feet are, if the case is one of long standing, again placed in adduction and the plaster bandages reapplied. No anæsthetic is necessary, as the previous overstretching, with the subsequent rest, has to a great extent removed the resisting muscular spasm. In from one to three weeks, according to the judgment of the surgeon, the bandages are removed and active treatment begun. The flat-foot on which forcible over-correction has been performed is now, although in good position, stiff, and all its movements are restricted and painful, and if the patient is allowed to go about without support and further treatment a recurrence of the deformity is inevitable.

The subsequent treatment is carried out with the aim of regaining free and painless movement in every direction, particularly in adduction. The foot is first immersed for ten minutes in hot water, afterward vigorously massaged, especially about the dorsum, and is then slowly forced into a position of adduction. When the limit of adduction has been reached the foot is firmly held until all pain has subsided, when the patient is instructed to make voluntary movements while the foot is in the corrected position, flexion and extension of the toes, and to contract the flexor muscles of the foot. The foot is then released, and twenty minutes of voluntary exercise follow, and at intervals during the day the patient, by active muscular efforts and passive motion, constantly works to one end—namely, to regain the lost power of adduction—while once daily the inward twisting is performed by the surgeon. Under this treatment the pain and stiffness rapidly disappear, and the foot constantly assumes a better position. The results that can be attained by this treatment persistently carried out, even in cases of long standing and apparently hopeless deformity, are surprising.

Meanwhile a brace for the foot has been manufactured out of thin steel molded while hot on the iron cast. It consists of a broad internal upright position, which covers the astragalo-scapoid joint, the weak point of the foot ; a molded arm reaches from the centre of the heel to a point just behind the bearing surface of the ball of the great toe ; an outer arm passes beneath the os calcis and cuboid bones,

and upward slightly on the outer aspect of the foot, which is thus held firmly in the brace, and cannot slip away to the outer side, as is the case with braces which depend upon the shoe to hold the foot in position. As the patient is instructed in the proper walk he throws his weight first on the outer side of the foot, thus pressing the external arm down against the sole of the shoe, a movement which at the same time causes the internal projection to press more firmly against the inner side of the foot. This pressure tends to turn the fore-foot inward, relieving the arch from weight. The inward flange prevents abduction, a movement which precedes the lowering of the arch. The brace is complete in itself and does not depend upon the shoe to prevent deformity. It is not in any way attached to the shoe, but retains itself in proper position—it may thus be changed from one shoe to another, and may be kept clean and free from rust. It allows the foot to rest upon its natural supports, the heel and the ball of the foot, providing support only to the weak points, and does not in any way restrict normal motion and activity, which are to be encouraged by insisting that the patient shall assume the proper attitude in walking. This brace is not a spring; it is inelastic, as it is intended to hold the foot in normal position, not to allow a recurrence of previous deformity. Finally, it is comfortable; the painful pressure on the sole of the foot, often complained of when simple arched supports are used being absent.

It is nickel-plated or tin-plated, and is then japanned. No covering is used, and, as it fits the foot perfectly, its presence in the shoe cannot be detected.

The shoe to be recommended is one of the Waukenphast pattern, with a sole broad enough to support the foot, having an inward twist to allow room for the great toe. In advanced cases of flat-foot the inner side of the sole should be built up after the method known as Thomas's, in order to throw the weight more to the outer side while the foot is still weak. The patient is then allowed to go about his usual occupations, no restriction being placed upon walking, provided the proper attitude, with but little divergence of the toes, is assumed.

The entire treatment described has consumed on an average three weeks. Daily exercises are still continued with the stretching until



the movements of the foot are absolutely free and unembarrassed. One of the best gymnastic exercises for strengthening the feet is to raise the body on the toes twenty or thirty times, morning and night. The best possible exercise is a proper walk. In an ordinary case the braces can be dispensed with in about six months, when a cure may usually have been accomplished, although all symptoms have disappeared long before.

## INDEX OF SURGICAL PROGRESS.

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### HEAD AND NECK.

**I. A Case of Trepanation for Cerebral Disease.**—By P. SODERBAUM (Upsala, Sweden). The patient, a girl eleven years of age, entered the hospital March 3, 1890. After having suffered from a slight headache three weeks before her entrance she had become paralyzed in her left arm, and, a week later, the paralysis extended to the left lower extremity and the left side of the face. Some groups of muscles were only parietic, while others, as the extensors, supinators and pronators of the hand, were completely paralytic. No disturbances of vision or sensibility. Neither traumatism nor purulent discharge from the ear or nose could be learned from the history of the case. The facial paralysis retrograded under the use of the iodide of potash and ice to the head of the patient. She could also walk somewhat. In the latter half of April convulsions set in without her losing consciousness. May 11th she had a convulsion, after which she found that she could not walk. Continuous vomiting followed, and her intellect was less clear. May 25th she was completely somnolent, complained continually of being chilly, while her body, to the touch, felt reekingly warm. May 25th, an operation was performed. The cranium was resected temporarily, after Wagner's method, over the right sulcus of Rolando. The greatest length of the flap was 5 cm., and its breadth 4.5 cm. Nothing abnormal was discovered except that the pia mater was more turgid than usual in a small district. Several deep punctures were made into the cerebral substance by means of a tenotome, after which an unusual quantity of serum escaped. The surface of the brain was wiped off with sterilized cotton and the flap sutured without drainage. Healing took place by first intention. The vomiting ceased on the day of the operation. May 26th, the patient was clearer. All the movements of the hand were free and unimpeded. June 2d she could walk unassisted across the floor.

June 17th all the movements of the arm were easily and freely made. In the fall of 1891 the writer heard from her that the improvement had continued steadily to continue until now she is to be regarded as well. The writer thinks that a cyst must have been evacuated by the punctures during the operation; he also suggests the possibility of a circumscribed meningitis being present. It is possible that the right lateral ventricle was punctured and evacuated?—*Upsala Läkareföreningsförhandlingar*, bd. 26, s. 68.

**II. Operation for Epileptoid Attacks.** By P. SODERBAUM (Upsala, Sweden). A young man, nineteen years of age, when five years old fell and struck upon his head. When he reached the age of eight he began to have vertiginous spells; recently, besides this he had presented attacks of unconsciousness nearly every day, and, once, a typical epileptic attack. Six and a half centimeters above the left mastoid process an indentation of the bone was discovered, which extended five and a half centimeters upwards and three to five centimeters backwards. This spot was soft, and pulsated simultaneously with the heart. At the operation this portion was found to be bare of bone and to be a defect, filled with a membrane, (the pia mater,) which was tense with fluid. This was incised. Posteriorly the brain was found to be œdematous to a certain extent. The cerebral mass was scarified and found to be apparently normal. The wound was tamponed with iodoform gauze, and the skin sutured over this. The temperature rose during the first two days; the subsequent course of the wound was afebrile. Two days after the gauze was removed, when healing by first intention followed. Three pronounced epileptic attacks were observed on the first, second and fourth day after the operation. For nine months he was free from his attacks, when he had two, separated by an interval of one month.—*Upsala Läkareföreningsförhandlingar*, bd. 27, s. 39.

**III. Osteoplastic Resection of the Cranium for Traumatic Epilepsy.** By Dr. BENDA (Berlin.) October 29, 1890, the writer did an extensive osteoplastic trepanation of the cranium for severe traumatic critical epilepsy in the left parietal region, with re-

removal of a portion of the cortex, according to Wagner's method ; and the permanently favorable result, of over five months' duration, he thought, justified the presentation of the patient.

The cannoneer, Wesz, of the second regiment of field artillery, who was formerly entirely well and with no neuropathic hereditary taint, was thrown from his horse, and striking upon the frozen ground, received a wound upon the left parietal region which soon healed, without medical attention, leaving a cicatrix 2 cm. in length. This happened about Christmas, 1888. For one and a-half years he was free from any trouble, beyond headaches appearing now and then. May 6, 1890, he suddenly fell, while unsaddling his horse, and was carried unconscious into the hospital. Here he presented continuous headaches, vertiginous attacks and an apathic state, with petulance and whining. The attacks of vertigo increased in number and passed into fainting spells, followed by trembling of the extremities. Later hysteric attacks, characterized by loud crying, sobbing and foolish behavior, were observed. After four months, September 4, a severe and general epileptic attack made its appearance, which was of several hours' duration, with four less severe subsequent attacks during the next few days. September 15th it was first remarked that the spasms began with trembling in the right foot, to be continued gradually as clonic (*Zuckingen*) in the right leg, and tonic contraction of the right arm, and finally to end as weaker contractions of the muscles of the opposite side of the body. Transient hemiparesis of the right lower extremity followed the attack. The following day a similar attack set in, when the quivering of the muscles of the right leg were accompanied by similar ones in the right arm. Then there succeeded a hysteric period of fourteen days' duration, which was free from attacks ; this was followed by one of four weeks' duration, in which one to two spasms daily regularly made their appearance. These were partly hysteric and partly epileptic in character. The former in the shape of hysteric attacks of anxiety and rage, as well as hallucinations ; the latter in the form of a right-sided hemiparesis, ascending to the leg and arm from the foot and sometimes passing over on to the opposite side, together with aphasia. In consequence of these frequent and violent attacks, which were uninfluenced by

either the iodine or bromide of potash, the patient began to lose in strength and his mind to fail. This case, though marked by a hysteric state, presented all the characteristics of traumatic cortical epilepsy requisite for operation, as laid down by V. Bergmann in his work, "*Die Chirurgische Behandlung der Hirnkrankheiten.*" The constant appearance of the spasms in one group of muscles, their distinct involvement in the attack, the extension of the spasms on the same and opposite sides were remarked, and finally the hemiparesis of those muscles first attacked completed the required indications. These, with the rapid decrease in bodily and mental strength, seemed to demand an operation at once.

October 29th the smoothly shaved skull was prepared for operation, the sulcus Rolando was located by Köhler indicator: at the anterior median circumference, where the motor centre of the leg was supposed to be, a cutaneous flap, 11 cm. in length and 9 cm. in breadth was formed, which included the cicatric and central sulcus; the base, 7 cm. broad, being situated over the ear. The edges of this flap were retracted 1 cm. and a bone-flap chiseled out from under this, the bone at the base being cut with a narrow chisel lying flat upon the bone. The flap, consisting of bone and scalp, was loosened and thrown back. As neither the bone nor dura mater presented anything abnormal, the latter was incised by a cross-cut and the brain exposed. The greatly hyperæmic and pulsating cortex, in which the single convolutions and sulci could be recognized with difficulty, presented nothing abnormal, and therefore the motor centre of the leg was sought out by means of the strong faradic current while the patient was deeply anæsthetized. The arm-centre and that of the trunk-muscles was found, while the leg-centre was only discovered after chiseling away a zone of bone,  $1\frac{1}{2}$  cm. in breadth at the median and posterior portion of the defect. The centre, a piece of cortex of the size of a nickel, was incised to the depth of two and a half millimeters, the hemorrhage being stopped by ligaturing two veins of the pia mater in the region of the arm centre. The wound was then tamponed with iodoform gauze, the flap laid over this, and dressed with an antiseptic bandage. On awakening from the anæsthetic the patient was bright, yet his right arm was completely paralyzed except

his thumb, and the right leg hemiparetic down to the knee. The wound healed uneventfully, if one except a slight rise of temperature of two days' duration. After two days the tampon of iodoform was removed, the soft parts closed by sutures and the cranial defect drained at two opposite points. In the course of seven days the wound had healed by first intention, and in fourteen days the drainage openings had also closed. On the fourteenth day after the operation the paralysis of the right arm suddenly retrograded, so that first, within three days the muscles of the thumb, the biceps and deltoid, then the flexors of the fingers and hand, subsequently the extensors, supinators and shoulder muscles, and finally the interossei, resumed their functions. On the contrary, there arose for several weeks nervous disturbances which gave rise to the fear that the epileptic attacks would set in again. These were restlessness, sleeplessness, tearing pains in the arm and shoulder, a sensation of the right side of the face being asleep, which was also present in the right side of the body; also a peculiar disturbance of speech, which appeared from time to time in the evening, and lasted about one-half hour. This was apparently due to aparesis of the hypoglossus; finally a hysteric attack, provoked by anger, which set in January 20th, and was terminated by slight contractions of the right leg. Recently the patient has been very rapidly progressing onward to recovery; since then he has not had the slightest indication of either an epileptic or hysteric attack, is intelligent, quiet and tractable; he is in the best of health, and has been on a furlough for two weeks without any harmful results. The only disturbances which remain are a very slight weakening of the strength of the right arm, which, measured with the dynamometer, shows a difference of  $\frac{1}{3}$  between the left and right; further, there is a slight sensation of numbness in the right curvature of the ribs, the right knee and the anterior portion of the right ring finger. He also complains of tiring easily after mental exertion, as reading, writing, etc. The patient was discharged as an invalid.

In the discussion following the report of this case Professor Bruns, of Tübingen, referred to a case where he performed trepanation for cortical epilepsy, dependent upon an apoplectic cyst of the size of a hazelnut. The attacks ceased for three months to recur.



V. Bergmann, of Berlin, would emphasize the point that one can only reckon on success in those cases where the typical picture of Jacksonian epilepsy is present.

Braun, of Königsberg, mentioned a case of cortical epilepsy following injury of the left parietal region, where he operated; he did not remove a portion of the cortex, as a small sanguinous cyst was discovered and removed. The operation was unsuccessful. A second operation was also without result. The epileptic attacks continuing, a third operation was done. As the spasms always began in the right thumb, this centre was sought out by the electric current and extirpated. After this the patient made a good recovery, which was confirmed as permanent after several months. Hence he thinks it justifiable to remove the cortical centre, even if there be discovered nothing abnormal in it.—*Verhandl der Deutsch Gesellsch für Chirurg*, XX Congress, 1891.

**IV.—Osteoplastic Operation for Bony Defect in the Cranium.**—Dr. By SCHÖNBORN (Würzburg). This case which the writer presented at the Twentieth Congress of the German Surgical Association is remarkable on account of the large defect which was successfully filled with osseous tissue.

The patient, Chr. Schl., eighteen years of age, was struck June 7th, 1890, by the iron bar of a hand-windlass, and both frontal bones fractured, with depression of the fragments. The patient became at once unconscious for a short time, recovering soon after, with some confusion of his senses; short-lasting spasms set in and hemorrhage from nose and mouth. The cutaneous wound was enlarged at once, and the fragments, ranging from 1–6 cm. in length and 1–2 cm. in breadth, were extracted. The longitudinal sinus was lacerated; the hemorrhage was stopped by means of a tamponade. On the left side the brain, exposed, crushed and porridge-like, was removed and the dura mater cut into for 3 cm. on the opposite side for fear of a subdural hæmatoma. The wound was tamponaded with iodoform gauze. The wound pursued a completely aseptic course, while the condition of the patient improved at once. The wound cicatrized, though slowly, and was entirely healed by the end of August.

The site of the cranial defect, and its continual pressure by the patient's head-wear, led the writer to attempt its closure by osteoplasty, although the patient was entirely well and possessed of normal intelligence. November 18th, 1890, the cicatrix, which measured 14 cm., obliquely, and 2-4 cm., postero-anteriorly, and corresponded exactly to a corresponding irregular bony defect, was extirpated. The subarachnoidal space was opened several times so that cerebro-spinal fluid escaped. Then the operator cut a tongue-shaped cutaneous flap, after König's method, 25-26 cm. in length, and 6-7 cm. in breadth, on the vertex, and separated from the frontal defect by a span of a finger's breadth. The outer table was then carefully separated from the inner by means of a chisel, in the whole extent of the flap. Naturally one could not avoid splinting and breaking it somewhat. This flap, consisting of bone, periosteum and skin, and which exactly corresponded to the defect, was fitted in and secured by sutures. The wound on the vertex was at once covered by Thiersch's method. Both healed without any disturbance, and January 21st, 1891, the patient left the hospital with a firm and complete cranium.

He was seen again March 31, 1891, and the skull found to be of a normal form, the transplanted bony flap firm and unimpressible, and only projecting over the base of the defect at a small spot. The patient's intelligence was undisturbed. Unfortunately the cosmetic effect was not good, as the skin on the transplanted portions was covered with hair which projected low down into the forehead, while a broad and oblique scar ran across the vertex. Therefore, April 3, 1891, the frontal skin was retransplanted to the bare scalp, and the resultant frontal wound covered by grafts after Thiersch. Again this time the wound healed uneventfully, and the patient was presented to the Congress.

In the discussion of this case J. Wolf, of Berlin, related a case where a similar though much smaller cranial defect was filled. An army officer had made an attempt at suicide five years before, when he had shot three revolver bullets into his forehead, leaving a defect in the bone. This was of the size of a cherry and had a very bad appearance. The dura mater and scar had grown together. A vertical

incision was made directly through the cicatrix, another on the left of the defect, about  $2\frac{1}{2}$  cm. from the first. The underlying bone was chiseled loose and the whole pushed over into the defect. As it was not quite sufficient to fill it entirely a second smaller piece, continuous with this bridge of skin, was chiseled loose and pushed into the remainder of the defect. Then both incisions were closed with sutures. The result of the operation was excellent. The bony tissue healed in permanently, and the forehead became completely smooth. This case was one of three cases of osteoplasty successfully operated upon by the speaker according to König's methods in which excellent results were obtained.

V. Eiselsberg, of Vienna, in September of 1890, had opportunity to cover a cranial defect of the size of a five-mark piece, which remained after extirpation of a carious piece of bone. He proceeded according to a method which had shortly before been described by A. Frankel. A celluloid plate was so cut that it could be fitted into the defect with great pains and pressure, when it remained firmly fixed there. The cutaneous wound healed by first intention, and the patient has remained well up to now, half a year later.—*Verhandl der Deutsch Gesellsch für Chirurg*, XX Congress, 1891.

**V. Repair of Cranial Defects.**—By K. G. SENNANDER, (Stockholm). The writer passes in review cranial osteoplasty, and mentions his second temporary resection according to Wagner's method, which was done for epilepsy. The cranium was very thick; the external table and diploe were sawed through by means of Stille's osteotome; only the internal table was chiseled away. Then he gives two cases where he successfully repaired two cranial defects. The first was that of a laborer, 31 years of age, who fell from a straw stack and struck his head upon an iron stake. Behind and above the left ear only a small skin wound could be found. The patient returned to his work, and seven days after he was found unconscious; he vomited and his pulse was 60. Taken at once to the hospital it was found that under the cutaneous wound the bone was broken and pushed into the brain, so that a circular hole, of 2 cm. diameter, was made out. This was enlarged with the chisel, and three quite large

fragments of bone were removed, together with some smaller fragments. They had penetrated the dura mater and lay imbedded in the purulently infiltrated cerebral mass. The wound was irrigated and dressed antiseptically with iodoform and iodoform gauze, which was simply placed over the wound. The patient became conscious after the operation, but aphasic symptoms, chiefly amnesic aphasia and paraphlegia, persisted for two weeks. The cerebrum protruded and formed a hernia, which enlarged rapidly. The granulations were scraped away and the periosteum loosened around the cranial opening, which was three by two and a half centimetres in diameter. A lamella of bone was then chiseled from the anterior surface of the left tibia with the periosteum adherent, together with some extraperiosteal connective tissue. This was two to three millimetres in thickness and of exactly the same size as the defect. It was filled in with the periosteum internally, the scalp was drawn over it and sutured with deep sutures. Both the cranial and tibial wound healed by first intention. One month and three days after the implantation of bone the patient was discharged as well and able to work; the cranial defect was felt to be filled with firm and hard tissue. The same was true when he was again seen several months later. In the other case a defect of the size of the end of one's finger and situated in the right parietal region was filled with a piece of the internal table which was extracted from the brain into which it had penetrated two cm. at the time of the accident. Healing took place by first intention under a dressing. The patient—a peasant, 48 years of age—was examined two and a half months after the operation, when the defect was found to be completely filled.—*Upsala Läkareföreningsförhandlingar*, bd. 26, s. 319

**VI. Enucleation of the Eye-ball, followed by Meningitis.** By FREDRIK RAMM. The writer records the case of a man, fifty-two years of age, who some time before had gotten a splinter of wood into his right eye. The splinter was removed and the wound healed with an adhesion between the iris and cornea. The eye was red, the conjunctiva chemotic, swollen, the eye-ball swollen as hard as a stone and painful. There was some photophobia of the other eye. Enucleation, under careful antisepsis was performed, and

in the beginning he improved. The day following the operation he had a chill, with rise of temperature and delirium. The cavity of the wound was thoroughly washed out with a 10 per cent. solution of corrosive sublimate, calomel given internally, ice-bags applied to his head and leeches employed. Forty-eight hours after death took place. The brain presented, at the necropsy purulent infiltration of the base and convexity. The right optic nerve was twice as thick as the left. No foreign body could be discovered in the enucleated eye.

—*Norsk Magazin for Laegevidenskaben*, R. 4, bd. VII, p. 502.

FRANK H. PRITCHARD (Norwalk, O.)

**VII. Malignant Disease of the Tonsils.** By DAVID NEWMAN, M. D. (Cincinnati). Sarcomatous disease is met with in the tonsils in a variety of forms, but the most common is the round celled or lympho-sarcoma, the most virulent disease, and one in which secondary metastases rapidly develop. Of the fifty-two cases collected nine were round-celled and eighteen lympho-sarcoma, twenty-three cases were published simply as sarcomata. In both encephaloid cancer and in round-celled sarcoma the disease extends rapidly, the neighboring lymphatic glands become infested early and the surrounding tissues are speedily encroached upon.

In very few forms of malignant disease has operative treatment been less successful than in those instances in which the tonsil has been primarily attacked.

The cases may be divided into two classes, those in which operative intervention is justifiable either with the object of eradicating or of staying the progress of the disease, and those instances in which palliative remedies can alone be recommended.

Tracheotomy, in the cases submitted to operations, should be performed a week previously, and at the time of the operation the anæsthetic should be administered through the tube; when anæsthesia is complete the larynx should be plugged with a sponge. The different methods of operating are fully discussed, and the results have been out of 144 cases collected 56 have been operated upon. The incomplete methods of operating are all condemned as not holding out the least prospect of cures.

Two considerations only can warrant operative measures, the hope of completely eradicating the disease, or of prolonging life and alleviating suffering.

Only five cases of non-recurrence of cancerous growth are known, and two others did not have local recurrence, but were attacked in other parts of the body.

In the sarcomata eight successful cases are recorded, but one suffered recurrence of the disease in the opposite tonsil, five years later from which she died.—*Amer. Journ. Med. Sci.*, May, 1892.

**VIII. Chloroform in Tracheotomy.** By P. GEFFREIER (Paris). The author has tabulated 87 cases of tracheotomy performed under chloroform, from a study of which he deduces the following conclusions.

Chloroform is undoubtedly of value in tracheotomy in children and involves no more danger than it does in any other operation.

The surgeon or a skilled assistant should administer the anæsthetic, watching carefully its effects upon respiration, and stimulating inspiration if necessary by tickling, etc.

If the respiration is uneven the chloroform should be discontinued and the operation performed as rapidly as possible.

The counter indications to the use of chloroform are advanced asphyxia, prostration from diphtheretic intoxication, and, in a less pronounced degree, decided cyanosis without difficulty in expiration, and slight cyanosis with difficulty in expiration. Neither slight cyanosis without difficulty in expiration nor the tender age of the patient should be considered as contra-indications.—*Rev. de Chirg.*, December, 1891. SAMUEL LLOYD (New York).

**IX. Primary Chondroma of the Hyoid Bone.** By Prof. IVAN K. SPIZARNYI (Moscow, Russia). The author communicates an extremely rare instance of new growth of the hyoid bone. [This is only the third case of the kind yet known in international literature. One of the preceding two, that of a primary chondroma in a woman, has been published by Dr. E. Boeckel in the *Gazette de Strasbourg*, 1862, the other, that of a metastatic cancer in a man with malignant disease of the œsophagus, by Dr. Peter in his *Beitraege fur menschen*



*und pathologischen Automie des Zungenbeinr*, Basel, 1888, p. 25]. A generally healthy and well-nourished man of 25, a merchant, of a healthy family, was admitted to Professor N. V. Sklifosovsky's clinic on account of a slowly, but steadily growing cervical tumor, causing hoarseness of the voice with a laryngeal timbre, difficulty in swallowing solids, and embarrassment of breathing on lying on his back. The swelling had been first noticed by the patient about five years previously, but his voice had begun to occasionally become hoarse eleven years before his admission. During the last 5 months the vocal alteration had been constant, while there had supervened the other symptoms just mentioned. On examination there was found an insolvent, hard, knobby, oval tumor of the size of a very big plum, situated on the right side of the neck, just below the lower jaw, in the region of the horn of the hyoid bone. The integuments were non-adherent and generally perfectly normal. The thyroid cartilage was slightly displaced to the left. On examination through the mouth the right facial wall was found to be protruding toward the laryngeal introitus, while about the root of the tongue there could be felt a hard, knobby, slightly movable tumor of the size of a mandarine orange, which obviously constituted a part of the cervical neoplasm. The right tonsil was enlarged, the lymphatic glands just above the cervical swelling indurated. A hyoid new growth diagnosed, and extirpation was resolved upon by Prof. Sklifosovsky. The neoplasm was exposed by a slightly curved incision which commenced at the level of, and three cm. outwards from, the right oral angle to end at the level of the cricoid cartilage. The removal proved to be rather difficult and tedious, since on each attempt at lifting up the mass by means of grasping instruments its tissues at once gave away; in addition, the new growth was closely adherent to the lateral walls of the pharynx and larynx. Ultimately it was isolated, chiefly by a forefinger, and, after the resection of the body of the hyoid bone, close to the right horn, removed with the latter. The hemorrhage was but slight. The cavity was plugged with iodoform gauze, the tampon being dispensed with on the twenty-fifth day after the operation. On the twenty-ninth the patient was discharged with the wound soundly healed, normal breathing

and swallowing, and a considerably improved voice. The new growth measured 7 x 6 x 4½ centimetres, and was surrounded with a connective tissue capsule. It proved to consist of myeline cartilage which, in the central strata, had undergone mucoid degeneration. The osseous tissue of the hyoid bone was tracelessly destroyed, the adjacent part of the bone body being altered with osteoporosis.—*Khirurgitcheskata Letopis*, 1892, No. 2, pp. 186–93, with 2 figs.

VALERUS IDELSON (Berne).

## ABDOMEN.

### I. Cases of Pneumotomy for Gangrene of the Lung.

By G. W. RONEBERG (Helsingfors, Finland).

1. The first case was that of a man, twenty-four years of age, who, one day in the spring, while eating, aspirated a piece of potato into his trachea. In September he presented consumptive symptoms and signs of a cavity in the apex of the left lung, together with extensive burrowing of pus out into the region of the left nipple. On opening the pus cavity a fistula was discovered leading up to the lower edge of the left rib, of which a piece was resected. A trial puncture into the lung revealed a slight quantity of pus. An opening was made into the lung by means of the handle of the scalpel and the fingers, as the pulmonary tissue was easily torn with the finger. No large cavity could be found; the wound was tamponaded with iodoform gauze. The patient's condition improved after the operation; the purulent discharge ceased and the fistula healed. The physical signs of the apex as well as a profuse purulent secretion, although it had lost its gangrenous odor, showed that a cavity was still present. As the general condition of the patient improved and he wanted to return home, while the cavity showed a tendency to heal, he was permitted to go.

2. The second case was that of a man greatly run down, who was admitted to the hospital with terribly putrid expectorations as well as symptoms of a large cavity in the lower lobe of the right lung. Trial puncture evacuated 100 ccm. of a penetratingly putrid fluid. On the day of the operation this fluid was found to have leaked through

the track of puncture and produced a gangrenous emphysema. A portion of the eighth rib was resected below the scapula and the adherent layers of the pleura punctured with the thermocautery. A large cavity with smooth walls was discovered containing gangrenous fluid and loose gangrenous pulmonary detritus. Although the gangrenous expectorations ceased and the temperature sank, the patient perished the third day after the operation from septic intoxication. At the necropsy the cavity was found empty, but in its vicinity were found another gangrenous focus of the size of a hen's egg, together with two similar and smaller ones in the same lobe.

3. The third case was that of a gangrenous empyema, due to a large gangrenous focus of 8-10 cm. diameter, situated on the surface of the lung. The usual operation for empyema was performed, with resection of the eighth rib in the left scapular line; the gangrenous spot cast itself off and, after seven weeks, the patient was completely well.—*Finska Läkaresällskapets handlingar*, bd. 32, s. 62-65.

**II. A Case of Pyothorax Subphrenicus; Operation; Recovery.** By J. W. RONEBERG (Helsingfors, Finland). The writer communicates a case of subphrenic abscess, operated on successfully in the clinic of Helsingfors, Finland. It was due either to a duodenal or gastric ulcer. The diagnosis, before the operation, was empyema of the pleural cavity. On resection of the ninth rib in the dorsal region and opening the pleura that cavity was found to be empty. A trial puncture revealed pus to be under the diaphragm, which was pushed up quite a distance. There had been complete dullness from the fifth rib down, in the mamillary line, the sixth rib in the axillary line and the lower angle of the scapula in the scapular line. The operation was interrupted and the wound tamponaded. After five days, when it was assumed that adhesions had formed, the diaphragm was incised and 1000 ccm. of thick pus of a disagreeable yet not gangrenous odor was evacuated. During the progress towards recovery pus appeared in pleural cavity, for which an operation for empyema was done. The patient eventually recovered entirely. The writer reviews the differential diagnosis of empyema and subphrenic pyothorax as well as the various operative procedures indicated. In both cases he would

make a high resection, and, in case an empty pleural cavity be found to either draw out the diaphragm and suture it to the edges of the wound at once, or do the same in two sittings.—*Finska Läkarsällskapets handlingar*, bd. 32, s. 87.

**III. Case of Cholecystectomy with Formation of a Communication between the Duodenum and the Ductus Coledochus.** By Dr. SPRENGEL (Dresden). The writer operated upon a woman, 40 years of age, who presented symptoms of obstruction of the gall-passage, and found a gall-stone in the ductus choledochus. By moderate force it could be pushed into a cavity which was supposed to be the duodenum. A few weeks after the operation the old symptoms returned worse than ever, while the stone was not passed per rectum. A second operation showed, after separation of extensive adhesions, that another stone was present, that it was not this time situated in the ductus choledochus, but in the cystic duct, immediately before it passed into the enormously distended ductus choledochus. The stone was returned to the gall-bladder only after crushing it through the walls of the duct, when it was possible to examine, the ductus choledochus and hepaticus as far as the liver. A second stone was discovered in the hepatic duct. As this was pushed towards the duodenum the ductus choledochus was so distended as to threaten to rupture the cystic duct at the place of ligation. In order to save the patient's life a fistula was formed between the ductus choledochus and the duodenum. The operation was carried out with difficulty, and only succeeded on application of a sero-serous (?) suture, opening of the intestine and duct and uniting the openings by means of a continuous suture through the mucous membrane and the former seroserous suture. The recovery was uneventful. Four months after the operation the patient is free from all trouble.—*Verhandl. d. Deutsch. Gesellsch. Chirurg.*, XX Congress, 1891.

**IV. A New Method of Resecting the Stomach, with Subsequent Gastroduodenostomy.** By PROF. KOCHER (Berne). In 1887 the speaker gave utterance to the opinion that it would be advisable to perform gastroenterostomy after resection of the cancerous portion, instead of doing resection of the pylorus with direct union, as recom-

mended by Billroth. This was based upon two cases which, though they recovered from the resection, perished afterwards without any apparent recurrence of cicatrical stenosis. His experience since then has only confirmed this view. Excepting in especially favorable cases, it is not possible to adjust the duodenum into the large gastric wound left by the resection so that one can close the wound by sutures. This is certainly attainable by modified gastroenterostomy. The speaker opens the jejunum on the convexity and not lengthwise of the intestine, but across it, and adjusts the margins of the wound to the corresponding opening made in the longest diameter and on the anterior surface of the stomach in such a manner that only the margin of the wound of the descending portion of the intestine is directly united to the stomach wound, as is ordinarily done, while the border of the ascending portion, on the contrary, is joined to the aperture in the stomach, 2 cm. removed from the margin. Thus a valve is formed which allows the stomachic contents to flow into the lower portion of the intestine.

• In three of the latter cases it was found more advantageous, after resection of the stomach, to join the end of the duodenum in an especially prepared opening; this was once made on the anterior and twice on the posterior surface of the stomach, and running parallel to the wound in the stomach. The latter procedure is to be preferred, as it exposes the duodenum to the least traction, but it is only practicable when free access is possible to insert the duodenum in the gastric opening by means of a continuous and uninterrupted line of sutures. This method was first performed with gastroduodenostomy February 3, 1892.

Dr. Kummell has suggested an improvement which greatly facilitates the application of this procedure, namely submucous separation of the gastric wall before incision. This renders a very exact removal of the diseased tissue possible, for by gradually cutting through the serous and then the muscular coats, one is enabled to ligature exactly, and step by step, to convince oneself that the tissue is actually normal and removed from the neoplasm. Although first suggested for the intestine this modification is more applicable to the stomach where the hemorrhage is not so severe. In one of the cases, after preliminarily dissecting back the serous and muscular coats of the stomach, the

mucous coat was ligated, and opening of the stomach avoided. This is especially valuable in cancerous conditions, for in spite of proper and thorough irrigations and the employment of antiseptic solutions one is by no means insured against infection. In the other cases the mucous membrane tore, and an occlusive suture was rendered necessary—the usual procedure. This appears quite simple as one has but one line of sutures to do with, and can close the extensive wound from the lesser to the greater curvature without interruption by means of a two or three stayed suture until one has a secure covering of serous membrane. That this method of gastroduodenostomy is practical is proved by the fact that the three cases operated on by this method all recovered. Two cases where resection of the pylorus was done with gastrojejunostomy died, but of complications which do not disparage the operation. One perished from gangrene of the colon, due to extensive adhesions; the other from an improper step in the procedure, as behind the occlusive duodenal suture a loose, circular ligature was applied; this cut through and led to perforation. Out of eleven recoveries which Kocher obtained, nine were cases of carcinoma. Of these latter three are still alive; one patient was operated on three years ago (May 12, 1888), and is completely well. As she is the mother of a physician she is under careful surveillance.

Escher, of Trieste, in the subsequent discussion pointed out that Morisani, of Naples, employed the submucous method in resection of the stomach and intestine. He himself had operated on a case after this method, and was very much satisfied with the results.—*Verhandl der Deutsch Gesellsch für Chirurg.*, 1891.

**V. Case of Partial Resection of Cæcum for Gangrenous Typhlitis; Recovery; Fatal Angulation of Intestine After Years.** By G. TILLMAN (Halmstad, Sweden). The patient, thirty years of age, was first operated on August 2, 1885. He then had been suffering for four days from violent symptoms of intestinal obstruction. The operation revealed extensive gangrene of the anterior portion of the cæcum and the beginning of the ascending colon. Resection was done with difficulty, and sutures carefully applied; the operation lasted four and a half hours. The patient progressed slowly



to recovery in five weeks, and remained well for five years. October 10, 1890, symptoms of obstruction again made their appearance and an operation was done October 22d. On account of the former operation another resection was thought impossible, so enterectomy was performed and an intestinal fistula made in the right iliac region. The patient died towards the end of the third day. The necropsy revealed general peritonitis but no fecal effusion into the peritoneal cavity. The occlusion was found to be due to a kinking of the intestine at the splenic flexure of the colon. The small intestines were either adherent to the abdominal wound or matted together near the cœcum.—*Nordiskt Medicinskt Arkivs Ny fjöld*, Bd. II., Aft. 1.

**VI. Bassini's Method for the Radical Operation of Inguinal Hernia.** By DR. ESCHER (Trieste). The speaker has operated in the past two and a half years on 53 cases of hernia, according to Bassini's method, and he has come to regard this as the most rational and the best, although his results are not so brilliant as Bassini's. This he ascribes to the relatively large number of complicated cases which he operated upon. While Bassini had 222 uncomplicated cases out of 262, he had only 35 uncomplicated out of 52, while 9 were incarcerated and 9 irreducible. Besides these the speaker's cases also included hernias of various portions of the large intestines, and 5 had been incarcerated shortly before the operation. Of his cases, 34 healed by first intention (25 uncomplicated cases, 5 incarcerated and 4 irreducible ones), 17 by suppuration (15 uncomplicated, 3 incarcerated and 4 irreducible); 2 died (1 incarcerated and 1 irreducible). Both of these fatal cases are not to be ascribed to the method but to the circumstances under which they were operated on. One of them, a man 73 years of age, with an incarcerated hernia, died from pneumonia, and the other who suffered from fatty heart and a large hernia of the large intestine and omentum, after the operation perished from fatty embolism. In the remaining cases the speaker was able to trace the result in 28 cases, which had been under observation from 3 months to 2 years and 5 months after the operation. Out of these, in 25 cases he found a permanent cure, and only a recurrence in 3 cases, which followed in 4 and 9 months respectively. These latter the writer explains by atrophy of the abdominal muscles which rendered

the application of an exact suture impossible. He especially emphasizes the fact that all the patients were discharged without a truss, as the suture was sufficient, even under trying circumstances, for example, where the patient suffered from cough and influenza or ascites. He calls direct attention, as Bassini has recently done, to the employment of silk.

In consideration of the details of the method and complications of his cases, the speaker must declare separation of the sac from the spermatic cord as more difficult than Bassini claims it to be, as fully a third of his cases presented considerable difficulty in this regard. He follows Bassini's advice to begin the separation at the neck, where the elements of the spermatic cord are more easily recognized. Accidental injury to the cord led, in two cases, to castration; in three other cases castration was performed, once on account of sarcoma of the testicle, once on account of the vermiform process being adherent to the testicle, and in a third case as it was impossible to isolate the cord. In three cases where cryptorchismus was found the testicle was replaced in the scrotum, where once, on account of improperly applied sutures to fixate the testicle, hemorrhage and suppuration into the vaginal tunic took place. Escher warns against too firmly compressing the deep layers of muscle and fascia by the sutures, as in two cases he saw infiltration follow, with consequent tedious suppuration in one of them. Finally he points out that in two cases he operated in two sittings, with advantage, tamponading the inguinal canal and then proceeding with the operation after 4 to 12 days. By this modification one may successfully operate on unfavorable, incarcerated and inflamed cases, radically.

Finally the speaker recommends the method as the most rational the best and the most certain, by means of which, with employment of the two sittings one may operate on complicated cases.

Wolfer, of Graz, opened the discussion by stating that experience shows that, in the radical operation of hernia, isolation of the hernial sac is often the source of the greatest difficulty, and on account of the frequent recurrences he would present an operation for consideration which he has employed in about fifty cases within the last three years without a single recurrence. This consists in: 1. Incision above the external aperture of the inguinal canal, with separation of

the fibres of the external oblique; 2. Opening of the hernial sac, with cauterization of its entire inner surface by means of the thermocautery. Application of an internal circular suture at the neck of the sac, according to Czerny; 3. Isolated sutures applied between the internal oblique and Poupart's ligament. The rectus muscle is then drawn over and sutured to Poupart's ligament. The obliquis externus is carefully sutured, leaving only a small aperture for the spermatic cord. When the speaker began to use his method that of Bassini was not known. He regards his method as less dangerous; he has not had a single fatal case. Excepting two cases, which were accompanied by suppuration he has not had a case which did not heal by first intention. He intends to make an extensive report of the final results.

2. Bergmann, of Berlin, does not believe that there is a method, for the radical operation of inguinal hernia, which protects from recurrence, in male patients. In the male the opening for the passage of the spermatic cord remains, and becoming distended it may, at any time, give rise to recurrence of a hernia. This condition can only be remedied by simultaneous castration. The radical operation of inguinal hernia, in women, on the contrary has given him the best and most lasting results. In several cases, which he operated on several years ago, he has not seen a recurrence.—*Verhandt der Deutsch Gesellsch für Chirurg.* XX Congress, 1891.

FRANK H. PRITCHARD (Norwalk, O.)

## EXTREMITIES.

**I. Operative Treatment of Irreducible Dislocations of the Great Toe and the Thumb.** By JORDAN LLOYD, F. R. C. S. (Birmingham, Eng). The author reports two cases; (1.) The first was a backward dislocation of the great toe operated upon after unsuccessful attempts at reduction. A mounted man, æt. 40, fell with his horse, his right foot under the animal in such a way that its entire weight came on to the toe of his foot with the foot in a vertical position. On admission to hospital the right great toe was found completely dislocated on to the back of the metatarsal bone; slightly abducted and flexed at the phalangeal joint. It could be moved

laterally without much pain; the rounded head of the metatarsal bone projected prominently in the sole of the foot, the skin being stretched tightly over it. Attempts at reduction by traction and manipulation under anæsthesia were entirely unsuccessful. On the following day the limb was duly exsanguinated, and a 2-inch vertical incision made, with its centre over the head of the metatarsal bone, which lay immediately beneath the skin. The head of the bone was found between the heads of the flexor brevis pollicis muscle, the internal head of which was about half torn across. The anterior ligament, with its imbedded sesamoid bones, was torn away from the metatarsal bone and had "shut back" behind the rounded head, constituting itself the chief if not the entire obstacle to reduction. The tendon of the flexor longus pollicis lay on the inner side of the metatarsal bone. Even after exposure of the parts it was impossible to reduce the dislocation until the anterior metacarpo-phalangeal ligament and the sesamoid bones had been completely divided by a free vertical incision made in their median line. Reduction then occurred at once, but recurred as rapidly until the wounds between the sesamoid bones, the capsule, and the muscle were sutured closely with catgut. No vessel was tied at the operation, although the tissues around were infiltrated with coagulated blood. Under aseptic dressings and immobilization a perfect cure was obtained in a few weeks.

(2.) The second case was an unreduced backward dislocation of the thumb, operated upon after four months. A girl, æt. 7, had slipped, catching her thumb against the side of a door. Immediate but unsuccessful treatment had been applied by another surgeon. After four months the thumb was found completely dislocated backward; the head of the metacarpal bone projected markedly forward, and was curved by a resistant layer of soft parts; the base of the first phalanx lay behind the metacarpal head, and was slightly abducted; the phalangeal joint was semi-flexed and readily movable. No pain had been complained of for several weeks. After sterilization and exsanguination of the parts a 2-inch incision was made over the front of the metacarpal head in the line of the thumb. Below the skin the bone was covered with newly organized fibrous tissue, which was divided and the articular surface of the metacarpus exposed; the

phalanx lay completely behind the metacarpal bone and had attached to its base the anterior metacarpo-phalangeal ligament, which had been torn from its upper attachment and had "shut back" behind the metacarpal head. The heads of the flexor brevis pollicis muscle had been torn apart and lay posteriorly to the metacarpal bone, where they had become attached by newly formed fibrous tissue. The anterior ligament was freely divided vertically at its middle, and after a few fibres of the internal head of the short flexor had been divided transversely, reduction was with little difficulty effected; the tendon of the long flexor was not seen—it certainly did not lie between the bones. The deformity recurred at once, but this was readily controlled by suture of the divided ligaments and muscle in front of the metacarpal bone. The wound was duly dressed and the limb put up with the fingers folded into a fist. The patient attained a satisfactory cure in a month, the movements being but slightly limited in comparison with the other limb.

In remarking upon the cause of irreducibility in fractures of this kind, the author particularly emphasizes the importance of the fact that the head of the bone pushes its way through the muscle above the level of the sesamoid bones, the anterior metacarpo-phalangeal ligament being at the same time torn away from its metacarpal attachment, and these two structures, which are closely incorporated with each other, "shut back" behind the protruding head and become closely applied to the anterior part of the articular surface of the displaced phalanx. The "shutting back" of these structures is due partly to their own elasticity and partly to the pull of the remaining attachments to them of all the short muscles of the thumb or great toe.—*London Lancet*, Feby. 27, 1892.

JAMES E. PILCHER (U. S. Army,.)

**II. Bacteriological and Anatomical Investigations on Lymphangitis of the Extremities.** By F. FISCHER (Strassburg). Fischer, together with E. Levy, has subjected the statements of Verneuil and Clado, who found the streptococcus in lymphangitic abscesses and asserted erysipelas and lymphangitis were identical, to examination; not only lymphangitic abscesses, but also inflamed

lymphatic vessels were examined. Small pieces of inflamed lymphatics were excised, under all precautions, from patients who were received in the clinic, suffering from severe suppurative processes with simultaneous lymphangitis. These were inoculated, after careful comminution upon agar and gelatine plates. The result of the bacteriological investigation was, in eight cases of excised inflamed lymphatics, three times staphylococcus pyogenes albus, once staphylococcus pyogenes aureus, twice staphylococcus cereus albus, once bacillus coli communis, once a mixed infection of staphylococcus pyogenes albus and aureus. In two cases of typical reticular lymphangitis the staphylococcus pyogenes albus was discovered in both cases. The lymphangitis abscesses—eight cases were examined—presented four times staphylococcus pyogenes albus, three times a mixed infection of staphylococcus pyogenes albus and aureus, once a mixed infection of staphylococcus pyogenes albus and streptococcus pyogenes and twice streptococcus pyogenes. These facts prove that the view of Verneuil and Clado is not correct. Demonstration, by culture, of the presence of micro-organism in the excised pieces of tissue was easy, yet their microscopic demonstration was a task which required much time and patience. The inflamed lymphatic vessel is not entirely closed by a thrombus, and the micro-organisms are inclosed in the thrombus. The endothelium of the lymphatic is preserved, the wall of the vessel thickened and infiltrated with round cells; a small infiltration of round cells was also found around the capillaries. The results of the investigation may be recapitulated as follows:

1. Lymphangitis of the extremities is due to various micro-organisms of suppuration.

2. By entrance of the micro-organism into a lymphatic a thrombus is formed.

3. The same micro-organisms are demonstrable in the thrombus as are found in the original suppurative focus. The presence of the streptococcus pyogenes is no proof that lymphangitis is an erysipelatous process, as no difference can be drawn between the streptococcus pyogenes and the streptococcus erysipelas.—*Verhandl Deutsch Gesellschaft fur Chirurg.* XX Congress, 1892.



**III. Acute Infectious Myelitis of the Upper End of the Femur.**—By MAX JORDAN (Heidelberg). The writer separates infectious osteomyelitis of the epiphyses from that of the diaphyses, and thinks it justifiable for anatomical, clinical and therapeutic reasons. The anatomical difference lies in the different localization of the same process which, in the majority of the cases, attacks the growing bone. In the diaphysic forms the micro-organisms range themselves near the cartilaginous disc of the epiphysis and lead to the formation of pus, which extends further into the medullary canal and outwards to the periosteum, between which and the bone, it continued to progress, often with such intensity as to produce necrosis of the entire shaft. As a rule, the non-vascular epiphysic discs offer an impassable barrier, and thus protect the neighboring joint; in some cases, running a violent course, it may be broken through and an effusion into the joint be a secondary, rarely enacted, consequence. In epiphysic osteomyelitis there is a primary localization of the inflammation in the articular end of the bone, *i. e.*, between the epiphysic disc and the articular cartilage. The joint is early involved, as there is but one direction for the pus to extend, and that is in the direction of the articular cartilage. The anatomical relations of the upper femoral epiphysis are peculiar. As the cartilaginous disc is situated at the boundary between the head and neck of the femur one would think it proper, strictly speaking, to regard the head only as epiphysic. The writer, however, places the boundary in the region of the trochanter minor, and thus designates osteomyelitis of the neck as epiphysic, as Schede has done in one case. Embryologically, as is seen in the new-born, the head, neck and trochanters form the only epiphysis, while in the further growth of the bone the trochanter, major and minor, each receive a cartilaginous disc from which ossification is completed. Then the neck of the femur presents the same peculiarities of other epiphyses, in being, anteriorly completely and posteriorly chiefly, surrounded by the articular capsule and included in the joint. These anatomical factors render the clinical course of the disease comprehensible, for, as it runs its course near the joint or at the upper end of the femur an immediate involvement of the joint is the consequence. Schede states that the articular affection either

soon, or even immediately, marks the symptoms of the bone, and in most cases its diagnosis is difficult, as the disease is usually not observed at first, but comes under the surgeon's notice as a severe articular inflammation. The diagnosis is of great importance in the treatment, for simple incision and search for the purulent focus in the bone by trepanation is by no means sufficient, as in the diaphysic form. For, to expose the focus in the bone the joint must be opened, and in order to remove it a typical resection must be done. The earlier this is done the less the destructive process is advanced and the better will be the chances for recovery with a functioning joint. Indeed, an early operation will find the joint nearly intact, enable one to extirpate the affected portion and in a relatively short time yield a perfect articulation. This affection is very rare. Schede and Stahl have communicated five cases of epiphysic osteomyelitis, of which only one ran its course in the hip joint. Müller has described sixteen cases from the clinic in Göttingen, all of which, excepting two, came under observation after the first stage had passed. Finally, Sannelongue, who has had an immense experience in this disease, regards this form as very rare. He has seen but two cases, and reports, a fatal one with luxation of the head of the femur backward. The writer describes, *in extenso*, two cases. In both the operation was the means of saving the patients' lives. They had been confined to their beds for five weeks, and were in such a serious condition that if left to themselves they would certainly have perished. The operation changed at once the entire scene, for, by radical removal of the primary focus the inflammatory process was extinguished, the fever fell at once, the pain disappeared, the albumen disappeared from the urine, and in eight weeks the patients were discharged cured. If one be content with simply evacuating the pus, though the direct danger is removed, the patient is exposed to the dangers of chronic suppuration and its reaction on the organism. In the first case of the author the functional result was not good. The necrosis was so far advanced that the resection was made low on the neck; the periosteum was destroyed, preventing regeneration of the bone. This was due to following the expectant treatment. The advantages of the radical method are demonstrated by the second case. The osseous lesion

was circumscribed and the periosteum intact. Therefore, the head was enucleated subperiosteally, leaving a periosteal cylinder, from which a new head developed. The articulation was nearly intact, the soft parts unchanged; neither fistulæ nor abscesses were present. Finally, the muscles were well nourished and resumed their functions at once, after the process had healed. This is a matter of great importance, for, as is seen in chronic articular affections, especially the tuberculous, the muscles lose much of their functionability, though in chronic osteomyelites the shortening is less, while the vital prognosis is rendered less favorable by exposing the individual to the dangers of a chronic course. This speaks against Volkmann's suggestion to make the resection through the necrotic portion and await demarcation. The earlier the resection the better will be the functional result. As there is no danger of a recurrence, no constitutional disease being present, the results of this treatment are permanent and favorable.—*Beitrage zur klinischen Chirurgie*, Bd. 7, Hft. 3 p. 493.

#### GENITO-URINARY ORGANS.

**I. Treatment of Ectopia of the Bladder.**—By Dr. SCHLANGE (Berlin). In order to avoid certain disagreeable consequences, following closure of the congenital defect in the bladder by flaps, especially the formation of concrements and the appearance of cystitis, it is necessary to make the bladder from the mucous membrane alone. Hence, Trendelenburg proposed, several years ago, to loosen the sacroiliac synchondroses with the chisel, and then to approximate the edges of the wound and the stumps of the pubic bones until they touched. Such a procedure is quite serious under any circumstances. The writer has tried, with success in several cases, to approximate the margins of the defect in a simpler manner, namely, by rendering the recti muscles movable. An incision, 10–15 cms. in length, is made at the outer side of this muscle, on a level with the anterior superior spine of the ilium as deep as the fascia of the transversus, which is carefully avoided in order to prevent the formation of a hernia, and extending down to the pubic bones. The rectus muscle is also separated from the subjacent structures and the pubes. It is easily separated from the transverse fascia; its pubic attachment was separated by chiseling through the ascending ramus of the pubes, thereby

loosening the bone with the muscle attached. An attempt to make an osteoplastic closure of the pelvic arch, as proposed by Neudörfer, was impossible, on account of the bones being too small and drawn upward by the muscles attached. The recti were so movable that they could easily be sutured, after extensive freshening up of their margins. Silver wire seems to be the best material for suturing, as it will remain a long time in the wound without causing any disturbance by its swelling. The sphincter vesicæ should be left unclosed only in those cases where too little of the vesical wall remains to permit a reservoir to be formed; in such cases one may form a urethra most easily, according to Thiersch's well known method. Where, however, the vesical defect is relatively small and quite a voluminous bladder is possible, the urethra should be formed at least in the prothatic portion, similarly to the bladder, by freshening up and suturing the edges of the defect. As after-treatment, the speaker recommends tamponading the gaping abdominal incisions with iodoform gauze, which, if the patient remains in a relatively good condition following the operation, one may leave for even 14 days in the wound. The writer then presented a 13 year old boy whom he had operated on two years before by this method. The patient suffers from incontinence, and has a fine fistula at the root of the penis, which he had when discharged from the hospital. Since the operation he has been well, and is now in a relatively satisfactory condition. Thiersch, of Leipsic, observed, in the discussion, that the method of turning the skin inward does not originate from him. He regarded the bladder formed by Schlange as too small. If there be no vesical reservoir then a sphincter is of no service.

Rydygier, of Cracow, tried Freudlenburg's procedure in a case; the child died. In a second case he operated in two sittings; the vesical margins were united, yet healing did not set in. In still another case he operated after the same method as Schlange, including fragments of bone from the pubic arch, which modification he regards as very important. Schlange, of Berlin, in reply to Thiersch, stated that he only sought to preserve the sphincter in those cases where much of the bladder was present. *Verhandl. d. Deutsch. Gesellsch. für Chirurg.* XX Congress.

FRANK H. PRITCHARD (Norwalk, O.)

**II. Two Cases of Ruptured Bladder.**—By P. A. LLOYD, F. R. C. S. (Haverfordwest, Eng.) The author reports two cases which occurred in the practice of Dr. Lediard, Surgeon to the Cumberland Infirmary. The first case was an extra-peritoneal rupture treated by suprapubic drainage. A woman, *æt.* 21, after a railway accident, found herself unable to stand or walk on account of inguinal and crural pain, although no bruises, or excoriations, or pelvic, or femoral injuries could be discovered. Complete anuria existed; catheterization drew off small amounts of bloody urine. After recovery from shock marked inguinal and hypogastric pains were present, especially on pressure. Abdominal poultices and opium were administered. On the third day peritonitis was evident, and on the fourth marks of contusion of the abdominal wall over the bladder; voluntary micturition reappeared and persisted at frequent intervals. On the eleventh day a tumor was noticed in the hypogastric region; dullness was present from the pubes nearly to the umbilicus, and a distinct edge could be felt at the upper limit of the swelling of the shape and appearance of the distended bladder. Hypogastric pain, fluctuation and purulent urine developed, together with troublesome vomiting and a temperature of  $100^{\circ}$  to  $102.6^{\circ}$ . On the thirty-first day, under chloroform, a two-inch median incision over the pubes gave exit to about thirty ounces of very malodorous purulent urine. Exploration of the cavity revealed, opening into the bladder close to the entrance of the left ureter, an aperture large enough to admit the tip of the forefinger, with round edges thickened and coated with phosphates. Flushing with hot boracic lotion and siphon drainage was applied, resulting in a *complete cure* on the one hundred and first day. The urinary functions resumed an entirely normal character.

The *second case* was an intra-peritoneal rupture treated by suture of the wound. A man, *æt.* 30, lying supine, received upon his abdomen the weight of a companion who was thrown from a vehicle. There was no shock and, at first, but little disability. He suffered from urgent desire but inability to micturate. Under chloroform by a lithotritry evacuator and an aspirator about a pint and a half of bloody urine was drawn off. The next day patient presented an anxious expression, a small and thready pulse, a distended abdomen, and

an absence of urine in the bladder. Abdominal section by Mr. Page, of Newcastle, discovered a collapsed bladder behind the pubes with a star-shaped rent about two inches long on the posterior surface; this was sutured with catgut, but *death* occurred before the completion of the operation. A large quantity of blood-clots and urine was found in the peritoneal cavity and signs of beginning peritonitis were evident.—*London Lancet*, Feb. 6, 1892.

JAMES E. PILCHER. (U. S. Army).

**III. Foreign Bodies in the Bladder.** By Dr. ALEXANDER L. EBERMANN. (St. Petersburg, Russia). The author relates two interesting cases, one of which refers to a young lady who introduced into her bladder a bundle of false hair (for masturbating purposes). Some time afterwards she married and had two normal labors. Shortly after her second confinement she fell severely ill, which induced her to seek admission to a hospital. During her stay in the latter it was repeatedly noticed that she was voiding hairs with her urine. The lady's condition being hopeless, no attempt at the extraction was made by the author. Shortly after her admission the patient died. On the *post-mortem* examination it was found that the sojourn of the hair bundle had caused severe cystitis with the perforation of the bladder both into the vagina and peritoneal cavity. The other case is that of a middle-aged married merchant who, when visiting on business a strange town, and experiencing an ardent "call" to sexual intercourse, sought advice of some local residents of his acquaintance, the latter happening to be members of the famous *Skoptzy* sect ("self-castrating people"). The consultants advised him to the effect that he "should take a thin wax-candle from an *ikona* (a holy image), dip it into an image-lamp's oil, fasten a thread on the candle's end, and introduce the instrument into the urethra." The patient followed the suggestion, but, unfortunately, during his trying to extract the appliance from the canal, the thread gave way, and the candle slipped down into his bladder. The author, to whom the patient applied several months later, succeeded in removing through the urethra first the candle's wick, then several bits of wax, and lastly a stone of the size of a bean which had formed around a wax nucleus.—*Vratch*, No. 10, 1892, p. 245.

(VALERIUS IDELSON, Berne).



## WOUNDS, INJURIES, ACCIDENTS.

**I. Ideal Dressing for Abdominal Wounds.** By H. A. KELLY, M. D. (Baltimore). The author has for two years past used a dressing which hermetically seals the wound in a thin layer, with certainty preventing the invasion of pathogenic organisms from without. This dressing is easily made, simple, and always satisfactory. After closure of the incision, the skin, the line of the wound, and the sutures are dried, and two layers of sterilized gauze or cheese-cloth, large enough to project five to ten centimetres (two to four inches) beyond the incision on all sides, laid on the skin. This is saturated with the following adhesive mixture, which is evenly distributed over the whole surface.

- R Squibb's Ether, or Washed Ether, and Alcohol, absolute, equal parts.  
 Bichloride of Mercury (Merck's recryst.) enough to make  
 the solution . . . . . 1000  
 [Anthony's] Snowy cotton, enough to make a syrupy consistence,  
 added in small pieces, stirring.

As soon as this is poured over the wound evaporation begins to take place at once, and the celluloidin hardens, gumming the gauze fast to the skin. To avoid delay in waiting for this to grow quite hard, and to prevent adhesion to the cotton applied above it, the whole surface is freely dusted over with a finely powdered mixture of iodoform and boric acid: 1-7.

The wound thus sealed with celluloidin gauze may be left untouched for a week or more, when the dressing should be softened with water, or more rapidly with ether, the gauze lifted off, and the stitches taken out.

If there are any signs of suppuration, as evidenced by pain, local tenderness and redness, associated with elevated temperature, the dressing should be removed earlier and the discharge of the stitch-hole abscess promoted in the usual way.

Sufficient cotton may now be heaped upon the abdomen to pad out the inequalities for the application of the bandage. Common cotton may be substituted for absorbent and prepared cotton, by simply sterilizing it in the Arnold steam-sterilizer. *Amer. Journ. Obstet. Dec. 1891.*

## GYNÆCOLOGICAL.

**I. Cystorraphy for the Cure of Vaginal Cystocele.** By DR. TUFFIER (Paris). Fixation of the bladder to the anterior abdominal walls (cystorraphy) is proposed by F. as a means of cure of vaginal cystocele. It may be performed as an adjunct to colporrhaphy, anterior elytrorrhaphy, and hysterorrhaphy or suturing of the uterus to the anterior abdominal wall. The feasibility of the operation, and its safety as well, was demonstrated upon animals preliminary to its performance upon the human subject. The operation is done as follows: The bladder is filled with from 250 to 300 grammes of a solution of boric acid, and an incision of the abdominal walls is made as if for supra-pubic cystotomy. The peritoneum is then separated from the bladder until that portion lying adjacent to the vaginal wall is bared. After partial emptying of the bladder the latter is drawn strongly upward and its lateral portions sutured to the abdominal wall. For this purpose 4 silk threads are passed through the bladder wall and then through the abdominal parietes. The left side is sutured first, to avoid some increased difficulties met with upon this side. Should the tension be considerable with danger of the cutting through of the sutures, the urachus at the summit of the bladder, after previous partial resection, may be likewise sutured with final closure by means of buried sutures of the abdominal wound; the dressing of the wound by iodoform gauze and tamponing of the vagina completes the operation, the latter being only removed on the 15th day, when the patient may be allowed to sit up. The sutures, in favorable course of the wound healing, may be removed on the 7th day. T. has operated by this method in 2 cases; the first subsequently suffered from a slight prolapse of the urethra, which was cured by an anterior elytrorrhaphy. At the end of 2 years, having been in the meanwhile under observation, she was found to be free from her former difficulties.—*Annal. de Gynecol.* 1890, T. XXXIV, p. 21.

**II. A New Method of Treatment for Recto-Vaginal Fistula.** By DR. G. FELIZET (Paris).—The method of F. is as follows: After passing a hollow sound through the fistulous opening

he passes the index finger of the left hand into the rectum, puts the perineum upon the stretch with the thumb, and splits the recto-vaginal wall in a direction upward and backwards, by means of a half-moon shaped incision, until the fistula is reached. In this manner 2 fistulæ are formed, one being a vagino-perineal and the other a recto-perineal. The latter is now, as in the case of a common rectal fistula, split upon the hollow sound and packed with antiseptic gauze. The entire operation can be performed in 10 minutes, and requires neither freshening of the surface nor the application of sutures. The injurious effects of the rectal contents being removed in this manner, the original fistula heals spontaneously, assisted, it may be, by the occasional application of the solidstick of nitrate of silver.—*Annal. de Gynecol.* 1891, T. XXXIV, p. 17.

GEO. RYERSON FOWLER (Brooklyn).

**III. Hysteropexia Abdominalis Anterior Intraperitonealis in Retroflexions and Retroversions of the Uterus.** By Dr. LUCIAN I. CHROSTOWSKI (St. Petersburg, Russia). The author details eleven cases of ventrofixation made by Professor K. F. Slaviansky in women aged from twenty-four to thirty-two. Nine of the patients had retroflexion, which in two was accompanied by extensive adhesions between the womb and the rectum, pelvis and appendages, while in seven the uterus was mobile. A tenth patient was suffering from retroversion with dense adhesions between the organ and rectum, etc. The eleventh case was that of a complete uterine prolapsus in a virgin. The operation was indicated by a train of intractable agonizing symptoms, including lumbar and hypogastric pains, obstinate constipation, dysmenorrhœa, menorrhagia, metrorrhagia, reflex neuroses of various kinds, etc. In three cases the operation was made after Leopold's method, in seven after Czerny's (*vide the Annals of Surgery*, September, 1889, p. 234), and in one after Jacob's. Its duration varied from twenty to forty minutes. The after course was always most satisfactory, the temperature never rising above 37.6° C., and the abdominal wound rapidly healing *per primous*. The patients were allowed to get up on from the fifteenth to the twenty-first day after the operation. In every one of the cases all the symptoms van-

ished tracelessly, the womb assuming a permanent position of a beautiful anteversiflexion. In none of the patients has any relapse yet occurred. In one case twenty-eight months passed since the operation; in three from twelve to twenty-one; in the remaining from one and one-half to nine.

The author was able to collect from international literature as many as 393 cases of hysteropexia for uterine posterior displacement (including Slaviansky's ten cases). An elaborate analysis of the series justifies him to lay down the following general propositions:

1. The best method of hysteropexia consists in a direct fixation of the womb to the anterior abdominal wall by means of horizontal stitches embedded within the abdominal wound.

2. The operation is indicated in such cases of laparotomy for disease of the appendages or for uterine tumors in which there is simultaneously present retroflexion or retroversion, giving rise to pronounced symptoms. Also in cases of fixed retroflexion or retroversion causing severe symptoms. And in such cases of mobile posterior displacement of the womb in which there are present otherwise intractable severe local or reflex symptoms.

3. Contra-indications for ventrofixation are identical with those for any abdominal section. The possibility of future conception does not contra-indicate the operation in question.

4. The procedure affords a reliable and radical means for curing the uterine displacement and for permanently freeing the woman from all the morbid manifestations.

5. The latter, however, frequently disappear but gradually.

6. In a majority of cases ventrofixation does not interfere either with conception or with a normal course of pregnancy, labor and puerperium. In some cases of gestation the womb may become detached from the abdominal wall, but even then, as a rule, no relapse of the displacement does occur after labor.

7. Ventrofixation does not give rise to any disturbances of the bladder.

8. The prognosis in cases of a pure and simple hysteropexia does not differ in any way from that of exploratory abdominal section. In

other words, the operation is entirely free from any danger, provided all aseptic rules are strictly observed.

9 In such cases where the procedure is combined with division of adhesions or with removal of diseased uterine appendages the prognosis is somewhat less favorable.

10. On the whole hysteropexia fully deserves to occupy a prominent place amongst the most valuable operations of modern gynecological surgery (*cf.* *Annals of Surgery*, October, 1890, pp. 311 and 313).—*St. Petersburg Inaugural Dissertation*, 1891-1892, No. 5, pp. 181.

**IV. Foreign Body in the Vagina.** By Dr. N. N. MOHILEV (Russia). A woman of fifty applied to the Mohilev Lying-in Hospital on account of severe pain during defecation of considerable standing, to which incontinence of urine had added itself quite recently. According to her statements, about six years previously she had contracted uterine prolapsus. In order to correct the latter, a female friend of hers had taken a glass-stopper from a decanter, broken its stem, and introduced the stopper's head into the vagina. "The home-made pessary had been worn by the patient ever since, successfully preventing the prolapsus and never causing any inconvenience until the time stated. On examination the foreign body proved to be firmly embedded in the upper third of the vagina, which was constricted and rigid at the level. The canal contained a number of calcareous concretions, some of them being as large as a nut. After some unsuccessful attempts the disc was ultimately turned edgeways, firmly grasped with forceps, and extracted, a quantity of sero-purulent fluid escaping during the operation. A subsequent examination revealed the presence of a vesico-vaginal fistula, situated 3 cm. above the external orifice of the urethra. Higher up, in the anterior poruit, there was found another slight slit-like opening leading into a purulent cavity whose anterior boundary was formed by the posterior wall of the bladder and the posterior by the wound. The latter was slightly enlarged and retroverted, the cervix shortened and flattened, the external os fully obliterated, the posterior vaginal wall traversed with numerous irregular fissures, while the mucous membrane of the

upper third of the canal was covered with a continuous croduyidid deposit. The diameter of the stopper amounted to  $5\frac{1}{4}$  cm. [The issue of the case is not stated. A case of a glass-disc remaining in the vagina for ten years was recently reported by Dr. F. L. Hayger: *vide the Annals of Surgery*, May, 1891, p. 371, Reg.]—*Proceedings of the Mohislev Medical Society for 1891.*

VALERIUS IDELSON (Berne).

**V. The Indications for and the Results to be Expected from Supravaginal Amputation of the Cervix Uteri for Carcinoma.** By DR. WINTER (Berlin.) The author remarks that in cases of carcinoma uteri total extirpation has, in the course of years, continued to become a more satisfactory and, as a rule, a more safe operation, and it is employed exclusively by the majority of German operators. The supravaginal amputation of the cervix, which was devised by Schröder fifteen years ago, has been almost entirely abandoned, notwithstanding the fact that Schröder developed it into a safe method, and Hoffmeier has shown that the permanent results in cases of carcinoma of the vaginal portion are as good as those following total extirpation.

The author, however, advocates resort to supravaginal amputation in cases in which the carcinoma is limited to the vaginal portion of the cervix, and in these only, and supports his views by the experience of the University Gynecological Clinic of Berlin, in which, since 1878, 155 supravaginal amputations for carcinoma were done. Of these 10 died from the operation, 13 were lost from sight: there remained 132 available for statistics. Of these 80 suffered from relapse, 49 remained healthy longer than two years, and 27 longer than five years. No relapse is likely to occur after more than five years, so that about 25 per cent. of recoveries will represent the final result of supravaginal amputations. These results are not inferior to those obtained by total extirpation in similar cases. The mortality of supravaginal amputation: Olshausen, Fritch, Leopold, Kaltenbach and Schauta, out of 474 extirpations had 40 deaths—that is, about 8.4 per cent. for a series of operations extending up to the present time. Supravaginal amputation has a mortality of  $6\frac{1}{2}$  per cent., and these deaths almost all occurred while the operation was being perfected.



Since the year 1884 650 operations have been reported, with only *one* death, and this was not wholly referable to the operation. Supra-vaginal amputation, therefore, should not be wholly discarded, since it is much less dangerous than total extirpation, and since the women may bear children without difficulty in the part of the uterus which is left, and since there are no dangers or sufferings which originate in the latter.

The number of the uterine cancers on which radical operations can be performed increases from year to year, with the progress of time, since the diagnosis can be made more accurately and earlier, and the methods of operation are continually growing more practicable. The writer has been able to prove this from the cases of the Berlin Clinic for Women, where since 1883 the percentage of cases operable has increased from 19 to 37. In general, however, to-day, in the great hospitals, on the average, about 25 per cent. of the women suffering from cancer undergo operation. Since about one-fourth of all the women who are operated on remain free from relapse it follows that about one-sixteenth or seven per cent., of these patients are permanently cured of cancer, while 93 per cent. of the sufferers continue to-day to perish of cancer as formerly.—*Annals of Gynecol. and Pædiat.*, April, 1892.

**VI. German Statistics on the Prognosis and Treatment of Extra-uterine Pregnancy.** DR. WINTER (Berlin).—Of 626 cases collected by Schauta, occurring during the years from 1876 to 1890, 369 recovered and 257 died, a mortality of 41 per cent. This was distributed as follows: In the first half of pregnancy 381 cases, 218 recovered, 163 deaths; in the second half of pregnancy 93 cases, 40 recoveries, 53 deaths; after the normal term of pregnancy 152 cases, 111 recoveries, 41 deaths; in 241 cases the cause of the affection was left entirely to nature, and of these 75 recovered, 166 died, the mortality thus being 66 per cent.; such cases, therefore, in the first half of pregnancy have a much more unfavorable prognosis than that of extra-uterine pregnancy in general, which has a mortality of 41 per cent., from which the conclusion may be drawn that the prognosis is better for those cases which are operated upon.

The most frequent spontaneous termination of extra-uterine pregnancy in the early months was rupture and hemorrhage into the general abdominal cavity; this occurred 128 times, with 121 deaths; the prognosis in such cases is, therefore, extremely gloomy. Twenty-two times rupture occurred with formation of hæmatocele; of these cases 8 died. In the second half of pregnancy death was caused most frequently by peritonitis, in consequence of decomposition of the foetal sac after death of the foetus. After the normal end of pregnancy the most frequent termination in cases which were left to nature was perforation of the foetal sac into the intestine, vagina or bladder, or through the abdominal wall; this most frequently occurred in the course of one or two years, but was delayed in some cases much longer, even up to ten years.

*Treatment.*—In recent years the treatment of extra-uterine pregnancy has become entirely surgical. Killing the foetus by electricity has not been accepted at all in Germany. Injections of morphine have only been employed, in any considerable number of cases, by Winckel, who has treated seven cases in this way, usually by injecting through the abdominal wall; two of these patients died and five recovered. In the early months, if the foetal sac has not yet ruptured and the ovum is living, all operators are agreed that the sac should be extirpated. If, on the other hand, the death of the ovum seems probable, as indicated by the expulsion of decidua, protracted hemorrhages, hardening of the tube and diminution of the size of the foetal sac, there is a division of opinion as to what should be done. Martin and Veit recommend the extirpation of the foetal sac in these cases also, supporting their opinion by a series of cases where, after such symptoms, rupture of the sac and fatal hemorrhage occurred. Other surgeons use expectant treatment for these cases. Veit deserves the most credit for establishing the operative treatment for extra-uterine pregnancy, by extirpation of the foetal sac. He operated 11 times in the year 1890; in 2 cases the ovum was living, in 9 it was dead; all the patients recovered. If the sac is ruptured and hemorrhage into the abdominal cavity has taken place, it is much more difficult to decide what course is indicated.

Schauta recommends operation even under such circumstances, basing his opinion on his statistics:

Rupture, with hemorrhage in the abdominal cavity, without operation: 115 died and 7 recovered.

Rupture, with hemorrhage into the free abdominal cavity, with laparotomy: 19 died, 102 recovered.

These numbers are inexact, since in the cases which terminated favorably the diagnosis of extra-uterine pregnancy was not always positive; of the nineteen fatal cases only six deaths were due to the operation, three on account of hemorrhage, one from ileus and two from sepsis, while twelve or more died only because the operation was delayed too long. The prognosis as to controlling the hemorrhage by laparotomy is therefore very favorable; in many cases the patients were saved in spite of the most extreme anæmia. Usually there is sufficient time to make suitable preparation for laparotomy, to wait for formation of hæmatocele when there is internal bleeding is a very unsafe matter, because it depends on the presence of previously existing adhesions in Douglass' space.—*Annals of Gynecol. and Pædæt*, April, 1892.

#### SYPHILIS.

**1. Case of Gummata of the Elbow and Knee-Joints.** By Dr. NIKOLAI A. MIKHAILOFF (St. Petersburg, Russia). A male peasant, aged 25, had contracted hard chancre in March, 1887. In August there had appeared rash over the body, sore throat and alopecia, to be followed in November by shallow ulcers over the shoulder-blades and extremities. In October, 1888, the patient had first noticed weakness of his left lower limb, with pain about the knee, on movements, and rigidity and pain about the left elbow-joint. When admitted to Professor V. M. Tarnovsky's clinic, in March, 1889, the man had enlarged and indurated cervical, cubital and inguinal glands, and a typical circular gummous ulcer on the posterior surface of the left thigh. The left knee-joint was markedly swollen (its circumference being 3 cm. larger than that of the right knee), œdematous, painless on pressure, the skin tense, but of a normal color. The limb was flexed at the joint to the angle of 165°

and could not be extended beyond  $175^{\circ}$ , all active and passive movements being associated with pain. The left elbow-joint presented similar changes, the extremity being immovably fixed at an angle of  $150^{\circ}$ . Near the inner condyles of the humerus there was situated a painless, flat, dense, immobile periosteal tumor of the size of a walnut. The treatment adopted by the author consisted in intramuscular injections of salicylate of mercury ( $1\frac{2}{3}$  grains at a time) suspended in vaseline-oil. After 20 injections (in the course of 40 days) the patient was discharged quite well, the cutaneous ulcer had soundly cicatrised, the articular gummata disappeared, all movements of the joints became normal, etc. Dr. Mikhailoff draws attention to the fact that gummous lesions of joints occur relatively rarely. At all events, international literature of the subject remains yet rather scanty. Of Russian authors, Dr. M. Kitaëvsky (*vide the London Medical Record*, 1882, p. 280), and Professors Mansüroff and Monastyrsky have published the most valuable contributions, to our knowledge, of syphilitic affections of joints.—*Vratch*, No. 19, 1890, p. 432.

VALERIUS IDELSON (Berne).

## REVIEWS OF BOOKS.

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PRACTICAL MIDWIFERY. By EDWARD REYNOLDS, M. D. A Handbook of Treatment. 8vo. pp. 424. Illustrated. New York, William Wood & Co. 1892.

As its title indicates, this volume is concerned with the art rather than with the science of midwifery. The author deals with the subject upon its practical side, recognizing the fact that in the management of gestation, labor, and the puerpual state, it is not enough that one knows what should be done; he must know also how to do it. His experience in directing the practical obstetric work of advanced students at the Harvard Medical School has led him to appreciate the difficulties that inexperience encounters in the conduct of these cases, and its need for fuller information than the systematic text-books on the subject furnish. The book is divided into six parts, the sub-titles being as follows: Pregnancy; Labor; Obstetric Surgery; Abnormal Labor; Pathology of Labor; the Puerperium. Under these heads all the phenomena of the parturient period is considered, with the diseases and complications peculiar and incident thereto. In all cases the plan of treatment advised is described in detail, with a simple directness of statement that is admirably suited to the character and purpose of the book. Especial care has been taken to make these descriptions clear, and the text is frequently supplemented by explanatory foot-notes.

Except under conditions which make it altogether impracticable, the observance of strict antisepsis in the lying-in chamber is insisted upon. The system that the author describes (and which can be readily carried out in private practice) is employed in the New York Maternity and in the Boston Lying-in Hospital. Since its adoption the death rate from septicæmia has been reduced in remarkable

degree in both institutions: In the former from 6.06 per cent. for the year immediately preceding its introduction, to .0059, .0018, .0021 per cent., respectively, for the three years immediately following; in the latter, from 4.58 per cent. in '83, '84, under the old methods, to .0064 per cent. in '85, '86 under the new (antiseptic), while from January, 1886, to January, 1891—five years—there were only three deaths from this cause.

Although the author believes, with good reason, that thorough *antisepsis* is essential to the best results in obstetric practice, the record of the work of the out-door clinic in Boston for the last three years indicates that immunity from severe septicaemia may be secured by the strict observance of *asepsis* during labor. In this service, the material being drawn from the most degraded and filthiest of the city's population, labor is conducted aseptically, "all meddling with the vagina during convalescence being scrupulously avoided," with the result that the mortality, previously very high, has been reduced to practically nothing, a thousand consecutive cases having been confined without a death from any cause.

These records abundantly prove the value of the methods in question. More than this, they show that between antisepsis and asepsis there can be no compromise. Either one system or the other must be employed. There is no middle course.

The book is designed particularly to meet the wants of the inexperienced practitioner; not, however, to take the place of well-known text-books, with whose teachings the reader is supposed to be familiar. It is supplemental, expositive, and, as such, supplies a deficiency in the literature of the subject to which it is a valuable addition.

D. R. BROWN.

A TREATISE ON BRIGHT'S DISEASE OF THE KIDNEYS. By HENRY B. MILLARD, M. A., M. D. Third edition. Illustrated. William Wood & Co., 1892.

In the preface to the first edition of this work, which appeared in 1883, the author states that "it is the result of the experience of nearly



twenty-six years of hospital and extensive private practice, and of several years study in the laboratory." Two years later, in 1885, a second edition was published. In the preface to this, the third edition, the author remarks that since the appearance of the second edition he has "devoted much time to retracing former experiences, and adding new," with the result that many opinions and conclusions previously entertained have been changed. In the present volume, therefore, we have the results of investigations into the pathology, diagnosis and treatment of diseases of the kidneys extending over a period of nearly thirty-five years; the statement in the preface referred to indicating that they have been pursued in the true spirit of scientific inquiry, which endeavors to interpret facts without prejudice, and seeks only to establish the truth.

The opening chapters deal with the minute anatomy of the kidneys, and contain an account of recent researches made by the author and others. Considerable space is given to discussion of the rod-like structure of the epithelia, first described by Heidenhain, which is regarded as "part and parcel of a reticulum present within every epithelium" this reticulum being "living matter," having the power of motion and of reproduction.

In the light of recent experiments the kidneys are believed to be purely organs of *secretion* as regards hippuric acid; therefore, and because urea and uric acid are found in larger quantities in the urine than in the blood, it is suggested that these products also are largely the result of the secretory function of the kidneys. Indeed, the urine is invariably referred to as a "*secretion*." These views, of course, are opposed to the generally accepted teaching that urea is altogether excrementitious, and the kidneys organs of excretion.

The author entirely renounces his belief in physiological albuminuria, including in the term temporary, intermittent, transient, cyclic, and dietetic. He meets the objection that different observers have found albumen in urine passed after prolonged exercise, exposure to cold, etc., by persons in apparent health, by assuming that in every such instance the analysis has been in fault, some other substance being mistaken for albumen. Few, I think, will agree that "when albumen is found in apparent health there is too great readiness to

assume that no pathological condition exists;" but he alleges this as one of the reasons for the opinion entertained by so many writers that the appearance of albumen in the urine under certain conditions is compatible with organic integrity of the kidneys.

In further support of his position he deems it sufficient to say that he has "examined the urine of a larger number of patients unaffected by renal diseases without finding a trace of albumen." Obviously such observations are not to the point. It, however, is inconceivable that the author should change the convictions of almost thirty years upon so important a matter, without adequate reasons, even if, as set forth in the chapter which treats of the subject, their sufficiency is not apparent.

Among the tests for albumen five only are mentioned: nitric acid, heat, the nitric-magnesian test, Tauret's and the author's (Millard).

The formula of the last mentioned is given as follows:

R.—Acidi phenic (glaciæ 95 per cent.) . . . . oz. ij  
 Acid. acet. pur. . . . . oz. viij  
 M. Add liquor potass . . . . . dr. ijvj  
 Filter.

"The mixture should be acid, colorless, and perfectly limpid." According to the author, both nitric acid and heat will show albumen if present in the proportion of 1-100000; Tauret's and Millard's test are both more sensitive, and about equally so, revealing it in the proportion of 1-300000. In the application of these tests, especial attention is called to the liability of mistaking *mucin* for albumen. As this substance is dissolved by strong acids, it is difficult to see how its presence can interfere with the nitric acid test properly performed.

Under the head of *Nephritis without Albuminuria* the histories of several undoubted cases of the disease are recorded in which repeated daily examinations of the urine failed to show albumen, and the author justly remarks that "The conclusion that nothing is the matter with the kidneys, because, after several examinations of the urine no albumen is found, is sometimes literally a fatal error." Again he says: "To test the urine simply for albumen is often useless." These truths cannot be insisted upon too often or too emphatically. It is undoubt-

edly true that early nephritis not infrequently escapes recognition; a test for albumen with negative result is apt to end the routine analysis. Quantitative tests for urea are not mentioned. Must the reader infer that knowledge of the quantity of urea excreted is of no importance?

Diseases of the kidneys are divided into three varieties:

1. Croupous (parenchymatous), acute and chronic.
2. Interstitial.
3. Suppurative.

As regards the first and second varieties, they are considered to differ only in the "degree in which the connective tissue and the epithelia are respectively affected." Clinically it is not usually difficult to distinguish between them. Both forms are discussed at length as regards the pathology, etiology, and treatment. Concerning the treatment of the different forms of the disease, the author remarks: "It seems unnecessary, as it is almost impossible, to make the treatment of each form of nephritis the subject of individual consideration, on the theory that there is any very great difference in the character of the remedies in use or in their mode of employment. The same principles and remedies which are applicable to the acute are appropriate to the chronic form."

"An important general distinction in the selection of remedies in acute and chronic nephritis is that whereas a certain class of irritant and stimulating diuretics, as squills, iron, cantharides, turpentine, etc., are sometimes not only useless, but dangerous in acute inflammation and recent congestions of the kidneys, in proportion as these conditions recede from an acute or recent character, they will sometimes be found appropriate and serviceable."

The author evidently believes in *treating* Bright's disease. Due attention is called to the importance of proper regulation of the diet and of maintaining the functional activity of the skin. The beneficial effects of the hot-air bath administered daily or every other day are particularly referred to. Numerous drugs useful as diuretics are mentioned. Among "curative" remedies he gives first place to calomel and the bichloride of mercury, the former being generally preferred in cases of the intestinal, the latter in cases of the croupous

variety. "In some cases, without being able to tell why, I have found benefit to be derived from the opposite course." Calomel is preferred for its diuretic effects. The dose employed ranges from gr.  $\frac{1}{100}$ — $\frac{1}{10}$ — $\frac{1}{20}$ , repeated every two or three hours. The bichloride is given in the form of tablet triturates, the dose being from gr.  $\frac{1}{200}$ —gr.  $\frac{1}{50}$ ; in some cases not more than gr.  $\frac{1}{300}$ . As to the action of calomel in this class of ailments, it is suggested that "since it is of undoubted use in controlling inflammations of mucous and serous membranes, as enterites, pleuritis, peritonitis, iritis, etc., and in inflammatory conditions of the lungs and liver characterized by plastic effusions, there is no reason why it may not produce analogous benefit in affections of the parenchymatous structure and of the connective tissue of the kidneys."

"Without supporting any supposed law of cure," he points out the fact that poisoning by corrosive sublimate produces much the same changes in the kidneys as are found in acute croupous nephritis.

In the treatment of convulsions, morphia, chloroform, chloral, and pilocarpine are mentioned.

The entire paragraph (which comprises all that is said upon the subject,) relative to the use of chloroform in this condition is quoted:

"In chloroform I believe we have a remedy equally efficacious with and less objectionable than morphine. The conditions of the heart in which chloroform cannot be administered should, however, be considered, nor must it be forgotten that in certain conditions of the kidneys the use of anæsthetics may be attended with danger; although as regards the kidneys chloroform is much safer than ether."

This paragraph—taken almost at random—is quoted because it fairly illustrates what is conceived to be a serious defect, particularly in a hand-book, namely, lack of precision. All that the author says in this paragraph is undoubtedly true, but undoubtedly the busy practitioner who refers to it desiring to know how to manage a case of uræmic convulsions will be disappointed.

A hand-book should be comprehensive, but terse, incisive, specific: the volume before us lacks these essential qualities. It is neither methodical in arrangement, nor precise in statement. Moreover, it

bears marks of great carelessness, or haste, in preparation ; for example, both iron and arsenic are *twice* referred to as useful in the treatment of nephritis, the second reference in each case being essentially a repetition of the first. Under arsenic the author says :

(Page 286.)

"Arsenic is a remedy from which I have *often derived benefit* in nephritis."

(Page 287.)

"I have found benefit from its use (arsenic) *in only a few instances.*"

D. R. BROWN.

# ANNALS OF SURGERY

A MONTHLY REVIEW OF SURGICAL SCIENCE AND PRACTICE

EDITED BY

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OF LONDON, ENG.

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PUBLISHED MONTHLY BY

THE UNIVERSITY OF PENNSYLVANIA PRESS  
PHILADELPHIA, PA.

1892.

London: Balliere, Tindall &amp; Cox, 20 King William Street, Strand.

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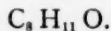


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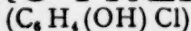
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